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THE ELECTRIC TELEGRAPH IN WARLIKE OPERATIONS.

THAT the rapid transmission of intelligence is one of the principal requirements for success in war goes without saying. Whether in the field of strategy, or within the narrower limits of tactics, or for purposes of administration, the rapid transmission of intelligence is equally important, and has been so in all ages. To be forewarned of danger, to keep informed of the enemy's movements, to take advantage of his mistakes, to gain success by surprise, etc., formed elements of the art of war in the times of Darius, Alexander, Cæsar, Belisarius, Gustavus Adolphus, Bonaparte, or of any other great captain. If we look for the first attempts at rapid transmission of intelligence, we must turn to the beginning of the art of war, which itself is older than history, and may be said to begin when Adam and Eve were expelled from Eden. It has been sought in all ages to convey information or orders by means of preconcerted signals, which differed in different ages and among different nations according to their progress in the arts and sciences.

The most primitive form of preconcerted signal is the fire on the mountain-top at night; it was employed in far-off ages, and has survived through many centuries to the present day. On the evening of November 1, in the year of our Lord 1889, eight fires on Saddle Peak, near San Carlos, Arizona, proclaimed far and wide over the reservation that eight Apache Indians had escaped from the civil authorities. Eleven hundred years before Christ the fall of Troy—so Æschylus tells us in his tragedy "Agamemnon"—was signaled the same night to

Argos by means of fires on Mounts Ida, Hermæus, Athos, Makistos, Mesapios, Kithæron, Ægiblanktos, and Arachnæus, a distance of about three hundred and fifty miles.

Herodotus tells us that King Perseus had a regular signal line, over which all important news was transmitted to him; and Polybius and Julius Africanus give a detailed description of the system. Optic telegraphs—*i.e.*, pieces of wood suspended on long poles and raised or lowered—were also used, not only by the Greeks and Macedonians, but by the Chinese, the Persians, and Romans. Hannibal used them to advantage in Spain and Africa, and built special signal-towers. An acoustic telegraph was also employed. We are told that Darius Hystaspes had a line of men posted at intervals on adjoining heights. These men were selected for their powerful voices, and called the messages one to the other, and thus transmitted them in one day a distance equal to thirty days' marches. The inferiority of this system, owing to the lack of secrecy, is evident. The optic telegraph was the one most used formerly, and it gained largely by the invention of the telescope, as signals could now be distinguished over a greater distance. In 1617, Kessler devised a system of night signals by putting a light into a barrel, and making the letters of the alphabet by opening the lid and disclosing the light a number of times equal to the number of the letter in the alphabet. He did not meet with favor; neither did the Marquis of Worcester in 1623, or Amonton, a Frenchman, in 1663. In 1684, Robert Hock, an Englishman, took up the scheme again, and stated that by means of the telescope certain signals could now be discerned over a great distance; but it was nearly a century before the idea was carried out by one of his countrymen, Edgeworth. In the same year Professor Bergstraesser in Hanau demonstrated how in a camp of two hundred thousand men orders could be transmitted simultaneously to all generals by means of an optic telegraph. He made trials in the presence of many prominent persons, and proved the practicability of his scheme to everybody's satisfaction; but his optic telegraph was soon relegated to oblivion, until ten years later, when it returned to Germany as the latest French invention, and now received the necessary attention. Claude Chappé, a French engineer, constructed at his home an optic telegraph in 1790, and three years later the government ordered the construction of the first line from Paris to Lille, with twenty-two stations. The first message passing over this line (August 29, 1794) was the news of the recovery of the Condé. Similar lines were now constructed from Paris to Calais, Strasburg, Toulon, Bayonne, and Brest.

The advantages derived by France from these telegraph-lines for war purposes, as well as others, caused their adoption in other countries. Lines were constructed in Sweden in 1795, England in 1795, Frankfort in 1798, Denmark in 1802, Prussia in 1833, and finally in

Russia in 1839, at which time England was already replacing them by electric telegraph-lines.

It is not intended to give a sketch of the origin and development of the latter. Its present state is the result of the labors of many men, nor can its invention be ascribed to any one individual, any more than the invention of the telescope. The electric telegraph made its appearance between 1837 and 1840, and it was not long before the Old and New World began to cover themselves with net-works of telegraph-lines. Like all other inventions, it found its place among the instruments of war, and it is the subject of this paper to investigate in what manner its introduction has influenced warlike operations.

The outbreak of a war is, as a rule, preceded by diplomatic negotiations. Before the introduction of the electric telegraph, the transmission of correspondence between governments and their ambassadors required much time, and the negotiations were apt to be drawn out. How quickly matters can now be adjusted is plain to all of us; but in order to realize what things used to be, let us imagine for a moment what would have been the case during our recent complications with Chile, in the absence of telegraph-lines and cables. Under such circumstances it would have been the duty of our war vessel to demand immediate reparation for the insult, and bloodshed and destruction would have been the result. Instead of all this the two governments concerned, communicating by telegraph, come quickly to an understanding, and the controversy is adjusted in a manner honorable to both; the mailed hand, raised to resent the blow, is dropped; the sense of justice triumphs over passion, reason over might.

The delays pending the negotiations referred to were utilized by one side or the other, or both, to make preparations, frequently unknown to the opponent, and it became a maxim in strategy, holding good to-day, so to conduct the diplomatic negotiations, after a nation has made up its mind to go to war, as to be able to cause a rupture at a time most favorable for the beginning of active operations,—*i.e.*, to gain the lead, or take the initiative, as it is called. In his letters on strategy Hohenlohe tells us that in 1806 Prussia resolved on war on August 7, and that the (secret) order for mobilization was issued two days later, while the Prussian ambassador in Paris was instructed to gain as much delay by negotiation as possible. The preparations now made by Prussia remained unknown to Napoleon until early in September, and it was not until late in that month that he became convinced of Prussia's real intentions and took active measures himself. For on the 24th of September, Berthier issued the order for the concentration of the several army corps then dispersed over Southern Germany for quarters and subsistence. At that time the major part of the Prussian army was already assembled on the frontier.

Here Prussia takes the political and strategical initiative, and gains thus a start of about six weeks on Napoleon for preparations. Had the electric telegraph existed then, the negotiations could not have been drawn out as they were, and neither the intentions of Prussia nor her preparations could have remained unknown so long to Napoleon.

To-day, since the electric telegraph spans the globe, annihilating time and space alike, all news of any importance at all is at once flashed to all parts of the globe; and no matter how far away something might have happened, we find it next morning in our paper with the same promptness as our local news. To-day governments will rarely succeed in hiding their true intentions, never in preventing warlike preparations from becoming known. Upon the termination of hostilities the telegraph furnishes the means for communicating the news at once to all participants in the struggle, and the shedding of blood after the conclusion of an armistice or treaty is prevented. Had the telegraph existed in the early part of our century, the battle of New Orleans would never have been fought, and we would have missed one of the brightest stars that now crowns our arms.

One more point is to be here considered. In the case of complications between nations the telegraph keeps all governments and their subjects informed of what transpires; the press publishes the feeling or opinion of the nations in the matter at issue; the whole world sits in judgment, as it were. In the face of the expressed disapproval of the civilized world no nation will lightly go to war to-day; personal quarrels between sovereigns or slight provocations will no longer be able to inflict the miseries of war upon a people. These favorable conditions have been produced by an increased state of civilization, which the electric telegraph, as a rapid means of communication, helps to increase and spread. It is itself the offspring of civilization, and has, like all other products of the same, immediately been made subservient to the art of war.

The rapidity with which business can be transacted by means of the telegraph, the rapidity of transportation by steam, the twin brother of electricity,—for what would railroads and railroad management be without the electric telegraph?—have impressed their stamp upon the age. Time has become money. Business methods have been revolutionized. Everything is arranged and prepared with a view to grasp opportunities. Time is even anticipated, and trades are made to-day in crops before the seed has been planted. The effect on the art of war has been great. Owing to the impossibility of keeping their real intentions or warlike preparations secret, owing to the absence of the long delays preceding the declaration of war, which formerly gave the necessary time to prepare for the field, the nations of Europe to-day are continually ready to take the field at once. All preparations are made; it is only necessary for the reserves to join, and to transport

the whole to the frontier. In order to fully reap the advantages offered by railroads and telegraphs, new branches have sprung up in the staffs of armies, charged with the management of these two modern means of communication. The art of quickly mobilizing armies has become paramount, and it has been mastered to such an extent that it is only necessary to give the word and the work begins, is carried out in accordance with the programme, and finished in the prescribed time. The adage of the advertising kodak manufacturer, "You touch the button, and we do the rest," applies here with terrible force. The margin of time allowable for mobilization has become so narrow that twenty-four hours more or less may have a decisive influence on the war.

Let us look at the practical results. We have seen above that in 1806 Prussia succeeded in mobilizing some one hundred thousand men in about six weeks, and concentrated them on the threatened frontier. The confines of the kingdom were then much narrower than in 1870, and that army when assembled stood not many marches from the centre of the state. During the winter of 1868–69 the Prussian general staff published a memoir on the strategic deployment of the Prussian army in case of war with France. It stated that on the tenth day the leading parts of the mobilized army would begin to arrive and reenforce the garrisons on the frontier; that on the thirteenth day two army corps; on the eighteenth day three hundred thousand men could be assembled, and that on the twentieth day they would be completely fitted out with trains, etc., and ready to take the field. On the 15th of July, 1870, Emil Olivier demanded and received for the French government a credit of five hundred millions of francs for war purposes. On the evening of the same day the telegraph carried the following message throughout Prussia: "Mobilization will take place in accordance with official programme. July 15 is the first day of mobilization." On August 3, just twenty days later, four hundred and forty thousand men stood ready on the frontier and took the offensive the next day. The advantages derived by the Prussian army from anticipating France in the completion of the mobilization were such as to enable it to destroy the entire French Imperial army, with the exception of six regiments only, in a little less than four weeks.

In the most recent times we have witnessed a brilliant example of rapid mobilization on a small scale, when the National Guard of the State of Pennsylvania was ordered out to protect life and property at Homestead against some four thousand strikers. The men composing this body of troops lived dispersed throughout the large State of Pennsylvania, but were all reached in little time by the telegraph, and, by means of the railroad, assembled within less than twenty-four hours.

Previous to our Civil War the electric telegraph took part in several campaigns on the Continent, especially during the Crimean War and

the campaign of 1859 in Italy; but whatever its employment may have been, it was dwarfed into insignificance by the military telegraph during our Civil War. Involving an enormous extent of country full of difficulties in the way of military operations, carried on by a nation self-reliant and full of resource, and lasting more than four years, this war evolved and developed much that was new in warfare, among which was the military telegraph. It is of interest to follow the electric telegraph somewhat in detail in this instance, because it was the first instance of its systematic use; because its operations assumed large proportions; because the efficiency of the work accomplished, especially on the battle-field, has not been surpassed since, and still remains standard.

In the spring of 1861, when the Civil War broke out, the small regular military establishment of the United States was not provided with a telegraph corps of builders and operators. There were in existence three principal telegraph companies, which controlled the telegraph business of the country. They were,—

1. The American Telegraph Company, commanding the country east of the Hudson River and the sea-board country along the Atlantic and Gulf, from Newfoundland to New Orleans. Branches ran to Albany, Pittsburg, Philadelphia, and Cincinnati, where they connected with,—

2. The Western Union Telegraph Company, which controlled all the northern territory not controlled by the American Telegraph Company. The eastern terminus was New York City.

3. The Southwestern Telegraph Company, connecting with the American Telegraph Company at Chattanooga, Mobile, and New Orleans, and controlling the West and Southwest, extending beyond the Mississippi to Texas and Arkansas, with head-quarters at Louisville, Kentucky.

The use of the electric telegraph for military purposes began with the outbreak of the war and grew with it. Its use for this purpose was considered a matter of course by our business-like nation; and as experience taught the best methods for operating the existing lines and building and operating new lines, a regular system was inaugurated, which once established, October 16, 1861, held its ground to the end of the war.

The attack on Fort Sumter and the President's call for seventy-five thousand volunteers were flashed over the country by the electric telegraph. The capital itself, during the first few dark and ominous weeks, was saved by a few companies urged up by telegraph. When it became necessary to equip and supply the volunteer troops concentrating at Washington, the War Department found it expedient and necessary to employ the services of some expert railroad manager, selecting Colonel Thomas A. Scott, of the Pennsylvania Railroad Company,

who soon afterwards was made Assistant Secretary of War. In selecting a man of his capacity the War Department showed great discernment, not only as to the choice of the man, but also of the paramount importance of prompt communication, and thus laid the foundation of what afterwards became a great and successful system of military telegraphs and railroads. Colonel Scott at once called on his staff, professional railroad men and telegraph operators. Let us now follow the growth of the military telegraph system as the war progressed.

On April 23 the White House was connected with the main telegraph-office in Washington by a wire. Nine days later a government line was built connecting the War Office and Navy-Yard. When the troops began to pour into Washington, Colonel Scott authorized one of his assistants to build such telegraph-lines as would be necessary to the authorities at Washington and in the Department of the Potomac.[1] Lines were built connecting the several camps with one another and with the War Department. The capital was surrounded by fortifications, all connected by telegraph. Thus naturally sprang up a demand for an increase in the force of operators. The material as well as the money, during the first seven months of the war, were, curiously enough, all furnished by the American Telegraph Company.

When Alexandria was taken the telegraph-line followed, and communication was established from Alexandria to the farthest outpost near Falls Church. Early in July, after the engagement at Big Bethel, a line was established between Fortress Monroe and Newport News *via* Hampton. While the first battle of Bull Run was being fought, a telegraph-station was in operation at Fairfax Court-House; the news from the battle-field was brought there by courier, and every turn in the course of the battle being immediately telegraphed to the rear, was eagerly followed by the people at large. This battle also emphasized the importance of telegraphic communication, as the defeat of the Federals was due to the arrival of Johnston on the battle-field. While facing General Patterson in the Shenandoah Valley he was in telegraphic communication with his superiors, and when McDowell advanced to Fairfax Court-House, Johnston by one o'clock next morning had received telegraphic orders to bring the major part of his troops to Manassas at once, which he did, while General Patterson was not in direct telegraphic communication with his superiors at the time of the battle, and had not been for several days.

From the small beginning detailed above the system of military telegraphy rapidly assumed large proportions. Before Yorktown, in 1862, all Federal head-quarters were connected with one another and with Fortress Monroe, the most advanced stations being just beyond

[1] Most of the details relating to the operations of the military telegraph during the Civil War are taken from Mr. Plum's work, "Military Telegraphy in the Civil War."

the reach of the enemy's shells. When the evacuation of the town was reported, the whole army was at once ordered in pursuit by telegraph, the enemy had barely reached Williamsburg, twelve miles distant, when he had to turn about and fight. The battle of Mechanicsville was practically conducted by telegraph.

From April 25 to November 15, 1861, there were built for military purposes, in the several departments, eleven hundred and thirty-seven miles of line with one hundred and six offices and one hundred and sixty-three operators; and as early as November 14, 1861, Colonel Stager says in his official report, "In many instances the wires followed the march of the army at the rate of eight or twelve miles per day, there being no other lines of communication upon the routes where these lines have been placed. The capacity of the telegraph for military service has been tested, and in affording rapid communication between the War Department, the commander-in-chief, and the several divisions of the army; in directing the movements of the troops and the transportation of supplies it may be safely asserted that it is an indispensable auxiliary in military operations. The organization of the military telegraph department, under the direction of the Secretary of War, will add greatly to the efficiency of this branch of the service."

When the action of Mill Springs took place, the telegraph had reached Somerset, a few miles in rear; when Fort Henry fell, the telegraph had reached the mouth of the Cumberland. When Pope advanced on New Madrid and Island No. 10, the telegraph from Pilot Knob had, in anticipation of this undertaking, reached Girardeau, and from there it advanced with Pope's march; thirty-six hours after he telegraphed to Cairo for siege-guns they were actively engaged. Thus it continued throughout the war. Every advancing column was closely followed, if not accompanied, by the line of thin wire; the armies in the field were linked to each other and to the War Department, so were the component parts of each army connected with one another. The large operations of the war, the conduct of the war on such a gigantic scale, would not have been practicable without the assistance of the ubiquitous telegraph.

At the beginning of the war the country was divided into a number of military departments or districts, and each commanding general appointed a manager of the military telegraph within the limits of his command. Recognizing the expediency of military organization, Mr. Smith, General Fremont's manager of military telegraphs, submitted a plan for organizing the operators, builders, and repairers within his department into a battalion of three companies, under military discipline, armed and equipped as soldiers. The plan was approved, one company was fully, two partially recruited, but for want of legal authority dissolved by the Secretary of War November 1, 1861, not, however, until they had rebuilt all the principal telegraph-lines in Missouri. Another

telegraphic organization was Chester's telegraph corps, a company in Sickels's brigade; as, however, only two of its members were practical operators, the rest of the company was held to ordinary military service.

When Mr. Anson Stager, who had been General McClellan's general manager of military telegraphs in West Virginia, became general manager of the military telegraph of the United States, he proposed an organization which placed the military telegraph under the Secretary of War; under him the general manager was to purchase, transport, and distribute all materials required in constructing, maintaining, and operating government telegraph-lines; to appoint an assistant for each military department, to select all operators, repairers, builders, etc.; to take possession, in case of emergency, of the existing commercial lines for military purposes. This plan was approved; the operators, etc., became civilian employés of the quartermaster's department, while the assistant managers were commissioned in the department. This was the organization to the end of the war.

In those days skilled operators were rare as compared with to-day. To simplify the sending and receiving of messages, and also to provide for rapid telegraphic communication for tactical purposes, the chief signal-officer of the army proposed as early as August, 1861, a movable telegraph train to accompany an army in the field. The instrument used was the Beardslee magneto-electric field telegraph machine; it was provided with a dial showing letters and numbers; a magnetic needle pointed to the letters or numbers sent. This instrument it was intended should make telegraphic communication a very simple matter, and enable any one to send and receive messages after very little practice. During the year ending June 30, 1863, there were thirty of such field telegraph trains in the field, each equipped to establish and operate five miles of line. It seems that this telegraph worked fairly well at short distances, but was not to be relied upon for long distances, and thus gave rise to dissatisfaction. The operators of the signal corps do not seem to have been equal in skill to the "Morse men," as they were called, and Mr. Plum quotes instances where at the point of junction of a military telegraph-line and a signal telegraph-line messages had to be transferred from the former to the latter, and the signal men were unable to keep up with the Morse men, and many messages were forwarded by mounted orderlies.

Colonel Stager, the general manager, thereupon recommended that the field telegraph trains be turned over to him by the signal corps, which was done. The field telegraph was now reorganized, the Beardslee instrument was replaced by a sounder, which was small, and could, when not in use, be carried in the operator's pocket; the wire was carried on a reel on the back of a mule and run off from it when required by the mule simply walking along; the batteries were to be

worked as they were packed on the mule. The signal men were replaced by expert Morse men. General Grant says of this field telegraph in his memoirs, "Nothing could be more complete than the organization and discipline of this body of brave and intelligent men. Insulated wires—insulated so that they would transmit messages in a storm, on the ground or under water—were wound upon reels, making about two hundred pounds weight of wire to each reel. Two men and one mule were detailed to each reel. The pack-saddle, on which this was carried, was provided with a rack like a sawbuck placed crosswise of the saddle, and placed above it so that the reel, with its wire, could revolve freely. There was a wagon supplied with an operator, battery, and telegraph instruments for each division, each corps, each army, and one for my head-quarters. There were wagons also loaded with light poles, about the size and length of a wall-tent pole, supplied with an iron spike in one end, used to hold the wires up when laid, so that wagons and artillery would not run over them. The mules thus loaded were assigned to brigades, and always kept with the command they were assigned to. The operators were also assigned to particular head-quarters, and never changed except by special order.

"The moment troops were put in position to go into camp, all the men connected with this branch of the service would proceed to put up their wires. A mule loaded with a coil of wire could be led to the rear of the nearest flank of the brigade he belonged to, and would be led in a line parallel thereto, while one man would hold an end of the wire and uncoil it as the mule was led off. When he had walked the length of the wire the whole of it would be on the ground. This would be done in rear of every brigade at the same time. The ends of all the wires would then be joined, making a continuous wire in rear of the whole army. The men attached to brigades and divisions would all commence at once raising the wires with their telegraph-poles. This was done by making a loop in the wire and putting it over the spike and raising the pole to a perpendicular position. . . . While this was being done, the telegraph wagons would take their positions near where the head-quarters they belonged to were to be established, and would connect with the wire. Thus in a few minutes' longer time than it took a mule to walk the length of its coil telegraphic communication would be established between all the head-quarters of the army. No orders ever had to be given to establish the telegraph."

The life of these telegraph operators was full of hardships and danger. Many were killed or died of wounds, many suffered in Southern prisons, and many died from disease contracted in the service. They were exposed to the enemy's cavalry, and to the vengeance of the guerrillas or a hostile population. In his report of December 5, 1863, to the President, the Secretary of War bestows the following high encomiums upon them, saying, "The military telegraph, under the gen-

eral direction of Colonel Stager and Major Eckert, has been of inestimable value to the service, and no corps has surpassed, few have equaled, the telegraph operators in diligence and devotion to their duties."

The magnitude of the operations of the military telegraph during the Civil War is best shown by figures: there were approximately constructed and operated 15,389 miles of line, over which 6,500,000 dispatches were set, at a total expense of $3,219,400.

During the campaign against Denmark, in 1864, the Prussians built eighteen hundred and ninety-two miles of telegraph. The operations were rather slow and there was ample time to do the work; the lines were extended forward to the army before the intrenchments of Düppel, and when they were assaulted, the capture of each redoubt was reported directly from the battle-field to the king's residence in Berlin.

During the war with Austria, in 1866, the Prussians operated five thousand eight hundred and thirty-seven miles of military telegraph.

But it was during the Franco-Prussian War that the military telegraph was again to play a great and important *rôle* in warfare. When this war broke out, neither the standing army of Prussia nor that of any other German state participating in it had a standing military telegraph corps, nor do they now. These corps were organized only at the outbreak of the war, which was made practicable by the fact that the government owned all, or nearly all, telegraph-lines, and there was no difficulty in procuring the necessary *personnel* and material. A field-officer of the engineer corps has charge of the imperial telegraph department, and all engineer officers while at the engineer school receive instruction for one week in the building, etc., of telegraph-lines. In addition to this, one lieutenant of the engineer corps is constantly on duty with the imperial telegraph department, a new one being detailed every six months. The number of military telegraph organizations mobilized is variable, depending upon the number of armies, etc., in the field. The service of the military telegraph is of three kinds,—service with the troops at the front, performed by the field telegraph divisions; service on the lines of communication, performed by the etappen telegraph divisions; and the service of the government telegraph. The latter furnishes all the men and material needed by the first two, and in addition builds and repairs lines where the former are inadequate. The work done by all these organizations in 1870–71 is commensurate with the results of the war, for, although it lasted but seven months and the theatre of war was much restricted as compared with our war, for instance, the military telegraph operated seventeen thousand two hundred and ninety-nine miles or line. The armies covering the siege of Paris against the new French levies were directed from head-quarters at Versailles by telegraph, and all parts of the army were kept informed of the progress made in the different parts

of the theatre of war. An officer of the general staff was detailed to write up the news from the seat of war for transmission to Germany, with a view of preventing such news from reaching the enemy as would enable him to turn the same to account against the invading armies, while at the same time furnishing to the people at home all the news valuable to them, among which were accurate lists of those killed and lightly or severely wounded, furnished immediately after each battle.

Since the war just mentioned the telegraph was extensively used during the Russo-Turkish War, and by the British troops in numerous campaigns in Africa and Asia, but never on a scale equal to that of the Civil War or the war of 1870–71.

In order that an army, after taking the field, may be enabled to derive all the advantages offered by the use of the telegraph, it is necessary that its several parts be connected with general head-quarters and with one another, and that the former be in constant communication with the base. From these requirements naturally result three kinds of telegraph used by the army,—the existing permanent lines in the home country, semi-permanent lines connecting general head-quarters with the base, and flying telegraphs which connect the parts of an army with head-quarters and with one another.

Nothing is to be said of the existing lines in the home country.

The semi-permanent lines, connecting as they do general head-quarters with the base, naturally follow the line of advance of the army, which is sure to take place over the principal highways and railroads. All of the latter and most of the former have, in time of peace, telegraph-lines running alongside of them, which, however, an advancing hostile army will find either damaged or destroyed by the retiring army for the purpose of rendering them useless for the invader. In either case a new line can be built or a damaged line repaired with greater facility than elsewhere, owing to the favorable conditions offered by these particular roads for transportation. In many cases all the material will not have disappeared, and whatever is left and serviceable can be utilized, saving material, labor, and transportation. As this saving will be effected at a time when transportation is most difficult to procure, such remnants of former lines will always decide the location of the line to be built.

The general head-quarters of a modern army may control several millions of men; the correspondence necessary to direct their movements and to keep them supplied is large, and the amount of business transacted on the semi-permanent lines is so heavy, that they usually carry more than one wire (during the Franco-Prussian War the German telegraph-line from Meaux to Châlons-sur-Marne carried eight wires), and more than one line will frequently be needed. Such lines are

therefore constructed of more substantial material. If they are long, the amount of material required would embarrass an army, and is therefore furnished either by private companies, as in the beginning of our Civil War, or, abroad, by the government, which, owning the telegraph-lines in its own country, has the necessary material and *personnel* always on hand.

The flying telegraph, which is to connect the several parts of the army with head-quarters and with one another, has to follow the march of the army promptly, and must therefore be of light material and easy to construct and take down. Abroad, the generally accepted scheme is that given by Buchholtz in his work on war telegraphy: Head-quarters is in rear of the centre; the centre column is followed by the semi-permanent telegraph; the flank columns are connected with head-quarters by flying lines laid out as the columns advance. At the end of the first day's march the centre column is connected with head-quarters by the semi-permanent line, the flank columns by the flying lines, general head-quarters remains stationary. At the end of the second day's march these distances will have been doubled. On this day head-quarters moves forward to where the centre column stopped after the first march; from this point a second construction party runs flying lines to the points where the flank columns are to rest on the completion of the second march. In this manner connection is always maintained, and the flying lines heretofore laid out by the flank columns are now taken down and again put in operation on the second day hence. Two constructing parties, or rather flying trains, are therefore needed, each provided with at least sufficient material to follow the army two marches.

But this should not be deemed enough. There should be enough material to follow the army another day's march in an emergency, and ordinarily this material could be utilized for establishing telegraphic communication along the rear of the troops after they have halted either for camp or battle. The material for such lines is carried in wagons constructed for the purpose; the kind of instruments, size and material of wire, etc., differ in different countries, and it is not the purpose of this paper to go into technical details.

Telegraph-lines, although immensely useful, have their disadvantages. From their nature they are very vulnerable. A wire can be cut and a line disabled in an instant. Being many miles in length the line is difficult to guard against an enterprising enemy, and while it may take but a few minutes to repair an ordinary break in the line, it may take hours to find it. Where the line runs through a hostile country, and guerrillas and sympathizers have to be taken into account in addition to the regular forces of the enemy, the difficulty increases. This is fully illustrated in our Civil War, especially in the West, where

some lines were cut every day, and sometimes oftener, and the repairers waylaid and murdered in cold blood by bushwhackers.

Considerations for the safety of the telegraph-lines have caused those nations in Europe whose defenses are thoroughly organized to seriously consider the question of underground cables. They would not be readily found by the enemy unless betrayed, and communication may be kept up with the district invaded by the enemy and even with the country behind his back. All his movements and other useful information concerning the enemy may thus be sent forward from his midst without his knowledge or he being able to prevent it; this would break the force of his enterprises. Germany has to-day a complete strategic net-work of subterranean lines designed for use in case of invasion.

A great defect of the telegraph-line is its lack of secrecy; it can be tapped and made to disclose its secrets. By cutting the wires and attaching an instrument all the messages passing over the wires may be read and stopped; not only this, but fictitious messages may be sent by the operator to the utter confusion of the operators on the line and that of the enemy. What a skillful leader may thus accomplish is best shown by the exploits of the Confederate partisans, who kept themselves informed of the movements of the forces sent to intercept them, and sent them fictitious messages to mislead them. In the latter part of December, 1862, the Confederate general J. E. B. Stuart, while on his Dumfries raid, captured the telegraph station at Burke's Station. Stuart always carried with him an accomplished telegraph operator, and he now had the satisfaction of receiving official information from General Heintzelmann's head-quarters, in Washington, concerning the dispositions which were being made to intercept him. After gaining the information he needed, he caused his operator to send a message to General M. G. Meigs, quartermaster-general, at Washington, in which he complained that the quality of the mules recently furnished to the army was so inferior as to greatly embarrass him in moving his captured wagons. Having thus revealed his locality, the telegraph wire was cut and he moved on. (McClellan's "Campaigns of Stuart's Cavalry," p. 201.)

Basil Duke, in his "History of Morgan's Cavalry" (p. 191), has the following: "We reached Midway about 12 P.M., a little town on the railroad, and equidistant from Lexington and Frankfort. What took place at Midway is best described in Ellsworth's language [Morgan's operator]. He says, 'At this place I surprised the operator, who was quietly sitting on the platform in front of his office enjoying himself hugely. Little did he suspect that the much-dreaded Morgan was in his vicinity. I demanded of him to call Lexington and inquire the time of day, which he did. This I did for the purpose of getting his style of handling the key and writing dispatches. My first impression

of his style from noting the paper in the instrument was confirmed. He was, to use a telegraphic term, a "plug" operator. I adopted his style of telegraphing, and commenced operations. In this office I found a single book, which proved very useful. It contained the calls of all the offices. Dispatch after dispatch was going through from Lexington, Georgetown, Paris, and Frankfort, all containing something in reference to Morgan. On commencing operations I discovered that there were two wires along the line of this railroad. One was what we term a "through" wire, running direct from Lexington to Frankfort, and not entering any of the way offices. I tested the line and found, by applying the ground wire, it made no difference with the circuit, and as Lexington was head-quarters, I cut Frankfort off. Midway was called; I answered and received the following:

"'"LEXINGTON, July 15, 1862.

"'"To J. M. WOOLUMS, operator, Midway:

"'"Will there be any danger in coming to Midway? Is everything all right?

"'"TAYLOR, Conductor."

"'I inquired of my prisoner (the operator) if he knew a man by the name of Taylor. He said Taylor was the conductor. I immediately gave Taylor the following reply:

"'"MIDWAY, July 15, 1862.

"'"To TAYLOR, Lexington:

"'"All right. Come on. No sign of rebels here.

"'"WOOLUMS."

"'The operator in Cincinnati then called Frankfort. I answered, and received about a dozen unimportant messages. He had no sooner finished than Lexington called Frankfort. Again I answered, and received the following message:

"'"LEXINGTON, July 15, 1862.

"'"To GENERAL FINNEL, Frankfort:

"'"I wish you to move the forces at Frankfort on the line of the Lexington Railroad immediately, and have the cars follow and take them up as soon as possible. Further orders will await them at Midway. I will, in three or four hours, move forward on the Georgetown pike. Will have most of my men mounted. Morgan left Versailles this morning with eight hundred and fifty men, on the Midway road, moving in the direction of Georgetown.

"'"BRIGADIER-GENERAL WARD."

"'This being our intention and position exactly, it was thought proper to throw General Ward on some other track. So, in the course of half an hour, I manufactured and sent the following dispatch, which was approved by General Morgan:

"'"MIDWAY, July 15, 1862.

"'"To BRIGADIER-GENERAL WARD, Lexington:

"'"Morgan with upward of one thousand men came within a mile of here, and took the old Frankfort road, marching, we suppose, to Frankfort. This is reliable.

"'"WOOLUMS, Operator."

"'In about ten minutes Lexington again called Frankfort, when I received the following:

"'"LEXINGTON, July 15, 1862.

"'"To GENERAL FINNEL, Frankfort:

"'"Morgan with more than one thousand men came within a mile of here, and took the old Frankfort road. This dispatch received from Midway, and is reliable.

"'"BRIGADIER-GENERAL WARD."

"'I receipted for this message, and again manufactured a message to confirm the information General Ward received from Midway, and not knowing the tariff from Frankfort to Lexington, I could not send a formal message, so, appearing greatly agitated, I waited until the circuit was occupied, and broke in, telling them to wait a minute, and commenced calling Lexington. He answered with as much gusto as I called him. I telegraphed as follows:

"'"FRANKFORT TO LEXINGTON:

"'"Tell General Ward our pickets are just driven in. Great excitement. Pickets say the force of the enemy must be two thousand.

"'"OPERATOR."

"'It was now 2 P.M., and General Morgan wished to be off for Georgetown. I ran a ground-wire connection, and opened the circuit on the Lexington end. This was to leave the impression that the Frankfort operator was skedaddling or that Morgan's men had destroyed the telegraph.'"

In order to make this tapping of the wires useless to the enemy, messages of any importance were invariably sent in cipher during the latter part of the war. But even thus the secrets passing over the wires are not securely guarded, as experts can decipher all but the most intricate ciphers in a short time.

One of the effects of the electric telegraph is that news from the seat of war can quickly reach the home country as well as other countries, and from the latter it may be furnished to the enemy's country. It is evident that, unless the news sent from the seat of war

is under proper control, it may serve to inform the enemy of important facts and enable him to defeat the plans of his opponents. When, in 1870, the German armies, after investing Bazaine in Metz, advanced upon Paris, their cavalry patrols found the large camp at Châlons empty. It was known at German head-quarters that McMahon had collected an army there of over one hundred thousand men. Where was that army now? On the 25th of August a telegram was received from London that McMahon with his army was at Reims, and endeavoring to effect a junction with Bazaine. This information had reached London from Paris by telegraph. Another telegram stated, in a similar manner, that McMahon had suddenly determined upon succoring Bazaine, although the safety of France would be jeopardized by his abandoning the road to Paris. This indicated that McMahon was making a flank march, and by next morning the German troops began a series of forced marches northward, coming up with the French on August 30, and defeating them at Sedan on September 1. This serves to illustrate how disastrous may be the consequences of the indiscretion of newspaper correspondents, and indicates the propriety of putting all the news leaving the seat of war under military control, and it has become customary to allow representatives of responsible papers to accompany head-quarters, where they can be controlled and where they are also able to get the most authentic information.

Affording such excellent communication, the electric telegraph is a constant temptation for the authorities at the seat of government to take an undue share in the direction of matters at the front. Much of the misfortunes of Austria in her wars during the past and present centuries is due to the Aulic Council, which, sitting at Vienna, undertook to regulate matters at the front at a time when the mounted courier was the fastest means of communication. To-day all the necessary information for a thorough understanding of the situation can be furnished instantaneously, and there is some justification now for regulating the campaign from the seat of government. This does not preclude, however, that matters can be better regulated from the front, as it was done before the introduction of the telegraph. In the latest wars head-quarters of the successful side was in the field. Napoleon the Third was in the field in Lombardy in 1859, Grant in 1864 and 1865, King William of Prussia in Bohemia in 1866 and in France in 1870, Emperor Nicolaus in Turkey in 1877.

While it is proper and indispensable that politics and strategy should go hand in hand, it is equally indispensable that the conduct of a campaign, after it has been decided upon, be left to the commanding general. The effects of interference beyond this limit are at the least of doubtful value so far as concerns success in the field. The telegraph, however, furnishes an excellent means for such interference. When it became known, in 1862, that Jackson was in the Shenandoah Valley, a short

telegram from Washington, depriving McClellan of forty thousand men, sufficed to ruin his campaign. If, instead of withdrawing these men, the entire army had been vigorously pushed forward against Richmond, it would have protected the national capital far more effectively; and while a crushing defeat of the Confederates might not have ended the war, it would have delivered Richmond in the hands of the Federals and given them all the advantages connected therewith. In our Civil War it took three years of experience to demonstrate to our government that there are things that can with advantage be left to the commanding general, and General Grant accepted the chief command with the distinct understanding that he was not to be interfered with. During the siege of Sebastopol the French and British governments both interfered so much with the operations that General Pelissier and Lord Raglan felt relieved when an accident finally interrupted telegraphic communication.

In active operations the effect of the electric telegraph consists in enabling the commander-in-chief to have a correct knowledge of the situation at each point of the theatre of war, to make his plans and transmit his orders before the situation changes, to secure the co-operation of widely-separated troops, and to make his blows fall quicker and harder. The defense of long strategic lines, of the sea-board, etc., has been rendered much easier by the telegraph. All attempts at effecting a passage or making a landing are reported at once by posts of observation; the defense has no difficulty in discerning the real from the false attack, and by means of the electric telegraph and steam to concentrate superior numbers at the threatened point.

The co-operation of widely-separated columns was difficult to secure at a time when the mounted courier was the fastest means of communication, and such operations were connected with much risk. The success or reverses of one column, the information gained by it of the enemy, could not be transmitted to the other in time to be turned to account, and the side operating on interior lines had the great advantage of being able to defeat the enemy in detail. This is illustrated by the campaign of 1796 in Southern Germany, where Archduke Charles of Austria acted on interior lines against Jourdan and Moreau. He kept informed of the progress of both hostile columns, while Jourdan and Moreau did not communicate, and at the proper moment combined superior numbers against Jourdan, and compelled him to fall back and drove him over the Rhine with great loss. Jourdan's retreat began on the 25th of August; Moreau was ignorant of the reverses of his colleague until September 19, and then he became aware of them indirectly only by the enemy's enterprises against his communications and his point of passage over the Rhine.

Troops thus thrown forward were out of the directing hand, because orders and information could not reach them in time. The

electric telegraph has removed much of the danger attending such operations: the commander-in-chief knows the progress and situation of each column, can guard against disaster, and secure effective co-operation. In 1866 we see the Prussian army invade Bohemia in two columns, with a view of effecting a junction in the vicinity of Gitschin. There are those who say that "Moltke violated every rule of war by such a movement, trying to effect a junction on the enemy's territory and in the face of his army." There were many good and sufficient reasons why the contemplated movement was good and proper, and not the least among them was that telegraphic communication could be kept up. The two Prussian columns did remain in telegraphic communication until a few days before the battle, and effected their junction on the field where the decisive battle was being fought.

In the case of reverses the electric telegraph gives prompt information, and thus, by promptly dispatching supports to the threatened point, the enemy can be prevented from reaping all the fruits of victory. When in 1863 Bragg was manœuvred out of Chattanooga by Rosecrans, and the heart of the Confederacy lay open, he was promptly re-enforced from Virginia and the South. The re-enforcements received enabled him to turn upon the invader and drive him back into Chattanooga, after one of the bloodiest struggles of the war. Rosecrans was now in a critical position, and so soon as his danger became known at Washington re-enforcements were ordered by telegraph from the Mississippi, where Grant had taken Vicksburg shortly before, and from the Army of the Potomac. In seven days two corps under Hooker, numbering about twenty-three thousand men, arrived at Nashville by railroad, a distance of eleven hundred and ninety-two miles. Four divisions under Sherman arrived, marching overland. All this resulted in a crushing defeat of the Confederates.

Having thus observed the combinations telegraphs and railroads admit of on the field of strategy, we cannot leave this part of the subject without inviting speculation as to the result of some campaigns had they been conducted with the assistance of telegraphs, or railroads and telegraphs both. What if Napoleon on his retreat from Moscow had been able to control his depots of supplies and his reserves by means of a single wire? If his weary army had been succored by fresh troops? What would have been the result of the wearisome campaign in France in 1814, with ubiquitous Napoleon on one side and the sluggish Schwarzenberg and fiery Blücher on the other?

It remains to discuss the use of the telegraph for tactical purposes. So far its use in this field has been rather limited as compared with its general use in warlike operations, but it is to be expected that hereafter its use on the battle-field will be the rule. Indeed, the armies of to-day are so enormous, their fronts when facing one another so extensive,

that the case where the commander-in-chief can overlook the entire field from some central eminence and direct the course of the battle will be the exception. Telegraphic communication between him and the several parts of his command has become a matter of necessity.

Where opposing armies face each other in position and remain stationary there will usually be ample time for both to provide telegraphic communication along their entire line, and the constructing parties will not find much difficulty in selecting the proper site for it, or in the construction itself. In the campaign against Denmark in 1864 the Prussians, while before the intrenchments of Düppel, brought the telegraph-lines up to the front at their leisure.

The operation is less simple where two armies approach each other: they are aware of one another's whereabouts in a general way only; one of them, finding suitable ground at hand, may take up a position to await the enemy's attack. Towards this position the columns of the other army converge on all available roads; each corps or group of corps is assigned a certain space within which to come in contact with and fasten on to the enemy. By the time when touch with the enemy has been established along his entire line, the commander-in-chief, in order to derive the full benefit from the telegraph, should be in communication with the subdivisions of his army, to enable him to insure concert of action and direct the course of the battle. Hence the telegraph-lines must be built while the troops are moving into position. With the enormous masses of men, animals, and vehicles thronging each other, and the uncertainty of the exact location, extent, and direction of the enemy's position, much judgment will be required for selecting a site neither too far forward nor too far in rear, and much difficulty will be encountered in constructing it, so as to be ready when the army is in contact with the enemy.

The battle of Gravelotte, on the 18th of August, 1870, furnishes a striking example. The French army held a position extending north and south about nine miles, and facing west. The German first and second armies, on the day of battle, advancing from the south and southwest, moved into position by executing an "on right into line" by army corps, and were to attack when the enemy's right had been reached and turned. The Ninth German Corps, advancing from Verneville, it was thought would come upon the right of the French line at Montigny la Grange, when in fact it brought up square against the French front, which extended several miles north of this place. As soon as this was discovered at head-quarters, orders were issued for the Ninth Corps to delay its attack until the turning movement of the Twelfth Corps should be completed and the Guard Corps could cooperate in the direction of Amanvillier. But while the order was being made out the roar of cannon from Verneville indicated that the battle had begun, and it became necessary to send the first army also

forward to the attack to support the parts of the second army now engaged. In consequence a bloody battle raged undecided from noon until 7 P.M., when the turning movement of the Twelfth Corps compelled the French right to retire. The Germans gained the day; their first army, which had suffered severely, had made little impression on the French left. Had telegraphic communication existed between the commander-in-chief and the different corps, the attack of the Ninth Corps might have been delayed to a more opportune moment, and such large sacrifices would not have been required of the first army, whose natural function in this battle was merely to contain the French left.

The most notable example of a successful turning movement accomplished by the aid of the telegraph is that of General Lazareff's column in the operations before Kars, in the fall of 1877. With a force of about twenty thousand men he made a complete circuit around the Turkish right, and planted himself firmly behind their left. As he advanced he unrolled a line of telegraph behind him, which was fortunately not molested by the Turks, and kept him in constant communication with the Grand Duke Michael, forty miles away. A combined attack of all the Russian forces resulted in a crushing defeat of the Turks, as might have been expected under such circumstances.

The long range and great battering power of modern ordnance, coupled with the great number of men now taking the field, have deprived the fortresses of the old style of much of their importance, and they have been replaced by systems of detached, independent works, within the circle of which there is ample room for a large army; some are capable of containing two or three hundred thousand men. To effectively defend such a place the telegraph is a necessity. It keeps the defender informed of the enemy's operations against the works at all points, enables him to discern the real from false attacks, and to have timely re-enforcements on hand at the threatened point. Where there is throughout the country a complete system of subterranean telegraph-lines the intrenched camp will in all probability remain in direct communication with the outer world at least for some time after the investment, and the invested army may thus act in deliberate co-operation with the field armies, knowing as it does what is taking place without.

The besieger, on the other hand, also derives great advantage from the telegraph. In fact, the examples occurring during the late wars would indicate that he has gained more thereby, tactically, than the defender. The advantage of the besieged over the besieger in having his forces concentrated, while that of the besieger is dispersed, is removed by the telegraph. Indeed, in 1870 an army of one hundred and fifty thousand men besieged and compelled the surrender of an army of two hundred thousand shut up in Metz. The investing army

kept reserves at favorable points and numerous posts of observation on prominent points, all connected with head-quarters at Corny by telegraph. Where the material for the latter had given out, optic telegraphs were constructed. The vigilance of the observers and the use of the telegraph gave timely warning of all approaching danger, and at the only serious sally of the garrison against Noisseville, on the 31st of August, the Germans found no difficulty in massing sufficient forces to drive the French back into their fortifications. The same was the case during the investment of Paris, which was surrounded with a telegraph-line seventy-nine kilometres in length, with fifty-nine offices. When the garrison undertook the large sortie of Villiers-Champigny on November 30, the Germans, although sorely pressed for a time, were able to assemble sufficient forces to drive the French back into Paris. In the two examples just quoted the investing army in each case was smaller in number than the invested army. It is not to be inferred from this, however, that the telegraph alone gave them such a superior power over the enemy. In similar cases the superiority of the invested army consists in numbers only, not in quality, and lack of skill or enterprise of the commander and absence of discipline and training on the part of the troops make it, in fact, far inferior to the investing army.

Having now traced the electric telegraph through its different uses in warfare, we may summarize its influence as intensifying war, hastening the operations, and making the blows to fall with greater force, rapidity, and deliberation. A greater field of combinations is opened to the skillful and enterprising commander. Our Civil War shows development of military telegraphy as well as military railroads; both grew with the war to such a degree that hardly anything new in their use can be said to have been originated since. There was no preparation for the war; the armies were raised after the outbreak of the war, trained in a war which marks an epoch in the history of warfare.

The Franco-Prussian War, waged by large armies carefully trained in time of peace, exhibits an example of the fullest and systematic use of the electric telegraph from the beginning of the war. The blows of the victor throughout fall with a rapidity, deliberation, and power unparalleled in the annals of war.

The electric telegraph has contributed its share towards making war short, sharp, and decisive.

CARL REICHMANN,
First Lieutenant Ninth Infantry.

MADISON BARRACK, NEW YORK,
March 20, 1893.

BURNSIDE IN EAST TENNESSEE.

MOUNTAIN SCENERY AND GUERRILLAS.

In August, 1863, the government determined to break one of the joints of the backbone of the Southern Confederacy by cutting loose from its base-line in Kentucky and moving by the way of the Cumberland Mountains to Knoxville, East Tennessee, where a grand trunk railroad that supplied men and material to the enemy might be cut, and force the foe to move their base-line farther to the south.

On the 23d of August, 1863, General Ambrose E. Burnside, commanding the Department of the Ohio and the Ninth Army Corps, crossed the Cumberland River at Somerset Ford with cavalry, infantry, and artillery, amounting to about twenty-five thousand men. It was a bold strike to rescue East Tennessee from the Confederate foe. Before us lay a wilderness of more than three hundred miles, with its mountain steeps, gorges, and streams.

The passage of the Cumberland at the ford was a difficult undertaking. On the south side of the rapid stream we were compelled to haul up the wagons and artillery with ropes grasped in the hands of a thousand men. When the army was safely encamped across the river, we rested but for one day, and then began a weary march through an unknown country that had been occupied by guerrilla and regular troops of the enemy since the beginning of hostilities. A trail of twelve days lay before us, through rugged mountains, ere we could tap the East Tennessee Railroad, near Knoxville, and sever Confederate communication from Richmond to the Southwest. Our wagon-trains did not get up on the night of the 23d until twelve o'clock, and the soldiers had to camp on the bare rocky earth, with nothing to cover them in the realm of dreamland but the twinkling stars peering out of the mysterious depths of the upper blue.

The air was chilly, and the sparkling jewels of heaven shone down on the slumbering camp with a cold gleam. Early in the morning twilight, after a can of coffee, raw bacon, and hardtack, the whole army proceeded on a rough march to a small town named Jacksburg, traveling over narrow rocky roads that almost defied the passage of mules and wagons. We soon began to rise over the spurs of the Cumberland Mountains, winding our way across a backbone ridge, until we came

to the rapid waters of New River. The view at some high turning-point in the road was grand and imposing, and in the clear morning air we could see at least a hundred miles away, the undulating lines of the mountains sweeping away in graceful grandeur to the glimmering lines of the distant horizon.

In many instances we marched along a region of country for twenty or twenty-five miles without seeing a living sign of human habitation; and the tumble-down log huts and burnt chimney-sites that we beheld convinced our minds that the loyal hearts that once beat responsive to the music of the Union were dead or refugees in Northern lands far away from the glowing peaks and leaping streams of Tennessee.

On the 29th and 30th of August we passed over the topmost peak of the Cumberland Mountains and camped some ten miles from the town of Montgomery, situated near the southern base of the mountain-range. The sight from the top of the mountain was most inspiring to the soul of man. Bold, bare rocks shot out against the clear sky like huge ships upon a raging ocean. Deep, dark chasms yawned in majestic horror upon the eye of the traveler, and the thundering roar of some far-off falls broke upon the ear like the sound of a mighty wind sweeping over primeval forests. The mountain looked magnificent,—

> "Its uplands, sloping, decked the mountain-side,
> Woods over woods, in gay theatric pride."

Yet, to the romantic and poetic soul filled with unutterable admiration, the gloaming, the starlight, and the moonlight must intermingle to bring out in bold relief the beauty and grandeur of mountain scenery. A moonlight night I stood upon one of the wildest peaks of the Cumberland, the sighing pines moaning to the stars, the wood-crickets chirping at my feet, and the sound of dashing cascades carried on the wings and dews of night, while the "bright and burning blazonry of God" glittered in their eternal depths, and lit up the green mountains with a glow of celestial light. At such a moment the soul communes with its Creator, and while we may doubt the reason of prayers, creeds, and churches, the most unreasonable man cannot deny the existence of a God as exemplified in the vast and mysterious realm spread out before him in air, water, earth, and sky. Those majestic mountain-tops were not called into being and clothed with a rich eternal verdure by chance. Those crystal springs and roaring rivers did not rise and meander to the sea without some grand design. The blue heavens above were not spread out in illimitable beauty and dotted all over with shining worlds without a plan. No! God lives in every breeze that wafts over the earth; shines in every star that glitters in the blue vault of heaven; sings with every warbler that flutters in the forest; breathes in every fragrant flower; and when the mortals of this transient life have lived out their little span, they mingle again, for some unknown purpose,

with the component parts of earth, and sink back to the bosom of grand Omnipotence, wise and eternal!

Burnside and his troops passed through the town of Montgomery on the 1st of September, and while guerrilla and rebel cavalry kept close watch of our march from a safe distance, they did not or could not balk us in our grand design,—of cutting one of the main arteries of the roaring rebellion. The dilapidation of the loyal town of Montgomery was sad to behold, and might be well compared to the deserted village described by Oliver Goldsmith. Its inhabitants lived in rural comfort before the Civil War, surrounded by smiling fields and productive vineyards that bedecked the upland sunny slopes. These mountain people, sprinkled with a colony of Germans, were true to the old flag when the tocsin of war was sounded, but were compelled to fly for their lives as lone refugees to the North. The plantation chivalry made it too hot for Union men to live in the atmosphere of slavery and Confederate conscription. In marching through the village I did not see a living citizen, but the ragged roofs, broken fences, rotten doors, creaking sign-boards, straggling hedges, wild weeds, blowing thistles, hanging cobwebs, and "swallows twittering from their straw-built shed" betokened decay, desolation, and death.

> "Sweet smiling village, loveliest of the lawn,
> Thy sports are fled, and all thy charms withdrawn;
> Amidst thy bowers the tyrant's hand is seen,
> And desolation saddens all thy green.
> Sunk are thy bowers, in shapeless ruin all,
> And the long grass o'ertops the mouldering wall,
> And trembling, shrinking from the spoiler's hand,
> Far, far away thy children leave the land."

I left Montgomery and looked back with a sigh up the straggling, broken village just as the evening sun cast its rays over the ruined homes of exiled, banished, loyal hearts, who forfeited all but truth and honor in their devotion to the stars and stripes.

After winding our warm and dusty way for four days more we neared the railroad at Lenoir. The guerrillas infested this region and became troublesome. At one spot in passing a gorge in the mountain, at the forks of the Holston River, two of the men of my regiment were killed by masked men in the brush. In the regiment were several fugitives or refugees from Tennessee. George Roban knew every pass in these mountains and every ford along the streams. It was only the work of a moment for me to follow where the smoke of the guerrillas' guns still scented the air. With a few men of Company I we dashed after the mountain assassins, determined to wreak a sweet vengeance on the region that harbored such cut-throats. It was a perilous search and somewhat like finding a needle in a haystack. We knew that to reach the south side the guerrillas would be compelled to go to Campbell's Ford, and instead of going the easy, long path, we cut right

through the brush into the scrub pines and cedars that intercepted our way. Inside of an hour we arrived at the ford and secreted ourselves in the bushes to await results. About an hour before sunset we saw five men sneaking down the mountain-side with long rifles on their shoulders. They were dressed in ragged, butternut clothes, with long, straggling hair, and might be taken for the advance-guard of Fra Diavolo's band of Italian robbers. They approached the stream very stealthily, sending one of their number to spy out the lay of the land. He finally blew a whistle that sounded like the shrill notes of a wild turkey, and in a few moments the gang of assassins were on the banks of the stream ready to cross. My men were not a hundred yards from where they stood. I yelled out, "Halt!" They were startled for a moment, and then plunged into the rapid stream. One volley killed three of them, wounded one, and the other was washed ashore. I ordered my men to capture the wounded fellow and follow the captain of the band, who gave his name as Stofford. The wounded guerrilla soon breathed his last, while Stofford threw himself on his knees and begged for mercy. I asked him to tell me the absolute truth and I'd consider his case. He recited to me with trembling, cowardly lips that for two years he had been employed by the Confederacy in running away Union men from Tennessee or forcing them into the Southern army, and in many instances had killed these loyalists and burned down their homes! At this moment in his recital one of my men accidentally discharged his rifle, and, strange to say, the bullet went crashing through the brain of Captain Stofford! I had no time to investigate the negligence of the soldier, and therefore left Mr. Stofford and his compeers to the vultures of the valley, and hastened back to my regiment, not overtaking the command until nearly daylight. But the two "boys in blue" who sleep under the laurel of East Tennessee were avenged in artistic and rapid form.

Next day Burnside's army struck the East Tennessee Railroad at Lenoir, proceeded to Concord, and on the 15th of September, 1863, our loyal legions marched through the city of Knoxville, and we never let go our grip on that stronghold of mountain valor and loyalty until the rebellion gave its last kick at Appomattox. The story of the siege of Knoxville and our environment by Longstreet's troops has been told a hundred times, and is now part of the history of the nation.

My regiment, the Twenty-fourth Kentucky, took a prominent part in the siege on the south side of the Holston River. In my brigade were the One Hundred and Third and One Hundred and Fourth Ohio, and the Sixty-fifth Illinois, commanded respectively by Colonels Casement, Reiley, and Daniel Cameron, of Chicago, the division being commanded by Milo S. Haskell.

JOHN A. JOYCE,
Adjutant Twenty-fourth Kentucky Regiment.

THE ARMS OF THE EUROPEAN INFANTRY.

ALTHOUGH we were the earliest in the invention and perfection of the breech-loading system in military small-arms, and of the ammunition that assured the success and permanence of the system, we have been surpassed and immeasurably outdone in this industry by the Europeans, and our infantry rifle is to-day incomparably inferior in range, accuracy, and rapidity of fire to the rifle of every nation in Europe.

The great improvement in infantry weapons and in explosives is so recent that as yet we have very little literature on these subjects. Such information as can be obtained is fragmentary, can only be gathered hap-hazard, and is very incomplete in the most important details. An exhaustive paper on the subject is therefore impossible at present.

In Europe there are now more than five millions of men armed with weapons that have been approved by boards of skillful and experienced officers that have been in session in the capitals of the different countries for about fifteen years. Their industry in this field of investigation has been unremitting, and the results of their labors have been singularly uniform and successful in the production of the most effective weapons and the most powerful explosives.

For a long time there was a question as to the superiority of magazine fire over that of single loading, during which five different systems of magazines came into use, of which the best one has been adopted by the principal nations, and improved to the highest degree of perfection in Germany, Austria, and England.

These arms are all bolt-guns, the magazine being either fixed or detachable, and in some cases being supplied with a cut-off, by which the ammunition in the magazine may be held in reserve while the rifle is being used as a single-loader. In some of them, however, a cartridge-case, or clip, containing a certain number of cartridges, is used without a cut-off, and single loading abandoned, the tendency being general in the Continental armies to abandon single loading when the magazine supply can be renewed rapidly, and to trust to fire discipline to control the expenditure of ammunition in action.

The establishment of the success of the breech-loading principle was followed by great activity among inventors in Europe and America,

but the American inventors were obliged to enter European markets with their models and improvements, on account of a law of Congress that prohibits the adoption by the United States of any breech-loading principle but that of the Springfield rifle. This is the reason that the most approved breech-loading arms, though of American origin, are to be found only in Europe; some recent improvements, as the diminution of the calibre, the coating of the bullet, and the invention of smokeless powder being the work of Europeans.

The reduction of the calibre, the most important of recent improvements, is chiefly the result of the investigation of the question of calibres by Professor Hebler, of Berlin, who, after years of inquiry, demonstrated mathematically and experimentally that the generally-accepted calibre of .45 is one-third too great, and that a calibre of about .30, with a very rapid and uniform twist in the rifling, gives the most satisfactory results in practice.

This change made practicable a reduction in the weight of the bullet to less than one-half its weight at calibre .45, and increased its velocity about thirty per cent. In France and Germany a further reduction was made in the volume of the cartridge by the substitution of a higher explosive for the common black powder, and although there have been some doubts about the permanence of this change, the new powder has up to the present withstood the practical tests that have been applied to it. It is obvious that these changes enable the European foot-soldier to carry on his person, and in means of transport from which his personal supply is to be replenished in action, about double the supply of ammunition that the American soldier can carry with him and have at hand, which, considered as auxiliary to the superiority of the European weapon, is an advantage of the greatest importance, and must in certain contingencies be decisive. In England compressed powder is still used as the explosive for small-arms, but it is thought that a smokeless or semi-smokeless compound, known as cordite, will soon be substituted for the powder.

It would be dogmatical to maintain that any one of these European rifles is much superior to the others in effectiveness. Each model is said to be entirely satisfactory to the people who are armed with it, and the manufacture of the models adopted is now going on with as much celerity as the available means will permit. It is therefore probable that the Europeans, having exhausted the resources of invention and ingenuity, will fight the inevitable wars that will result in a readjustment of the political equilibrium of Europe and Asia with the infantry weapons now being manufactured in such enormous numbers in the European manufactories, and with a smokeless powder that will drive the missile with a velocity at least one-third greater than it can be driven by the best black powder. Indeed, it seems as if a greater effectiveness in small-arms and ammunition is impossible, and that an

equation in the proportions of mass in the rifle and the projectile, in calibre rifling and twist, in the sectional density of the bullet, and in the power of the explosive has been reached, and beyond which any possible improvement would be ineffective, for the reason that to exceed the present limits would be to exceed the muscular and visual power of men.

THE ENGLISH RIFLE.

The rifle recently adopted by the English government is known as the Lee-speed, and is primarily an American invention. It has a bolt-breech mechanism, with a forward and backward action, and is fed from an under-breech, semi-detachable magazine, made of sheet-metal, and containing ten cartridges resting on each other horizontally, five on each side, in quincunx order when viewed in section, and are raised by an elevating spring to the bolt, from which position they are delivered into the chamber, one from each side alternately, or they may be held in reserve in the magazine by the cut-off while the rifle is being loaded by hand for deliberate firing. This is the original Lee box-magazine modified and enlarged to take ten cartridges instead of five. This magazine is regarded with much favor in Europe, and all European arms that can be altered to take it, either as a fixture to the rifle or detachable, have been or are being altered for that purpose, the chief advantage claimed for it being that it can be easily and rapidly re-charged, and that the cartridges being fed from a box under the breech, through a vertical plane, the "balance" of the rifle is but very little disturbed by the depletion of the magazine supply, as is the case with the *butt-stock* and *under-barrel* tubular magazines like those of the Lebel, the Hotchkiss, and the old Mauser.

In all these European guns the bolt, which is about five inches long, is operated by a lever, and slides forward and back in a steel shoe or case, more or less massive in structure, dependent on whether the bolt is locked at the forward end in the breech or at the rear.

In the English gun the locking is at the rear end of the bolt, almost under the eye of the soldier when aiming, and necessitating on that account a great weight of metal in the bolt and in the walls of the shoe, between that point and the breech, to withstand the force of the recoil and to give a large factor of safety to the soldier.

In these guns the main-spring is a steel spiral coiled around the bolt, or within it around the firing-pin. In the Lee-speed it is within the bolt. When the bolt is withdrawn the spring is brought to a tension that corresponds to the full-cock of the Springfield, and is held there by a catch attached to the firing-pin, which is held firmly in the first position by the trigger when the breech is closed and until released by the pull.

The bolt is rotated by the lever about a quarter of a turn when the

breech is opened and closed, and a safety-catch locks the mechanism when the rifle is carried loaded, to prevent accidental discharge. Two sets of sights are used, one set on the barrel and graduated from the point-blank up to nineteen hundred yards. The other is graduated from eighteen hundred to three thousand five hundred yards, and both front and rear sight is placed on the left side of the rifle, a very convenient adjustment for long-range firing. A wooden hand-guard over the rear end of the barrel protects the left hand from the heat developed by rapid fire.

The locking of the bolt at the rear end must be considered a defect, because it necessitates a much greater amount of metal in both bolt and shoe than would be consistent with safety if the bolt was locked in the upper end in the breech, thereby diminishing the weight without reducing the factor of safety, and leaving sufficient space in the shoe, between it and the bolt, for a main-spring of the requisite dimension and strength. The breech mechanism consists of twenty-three parts, some of them being modifications designed by the Board on Small-Arms, and the utility of which has been disputed by very competent experts.

This gun is rifled on the Metford plan, in this respect differing from all other European rifles. The Metford system of rifling consists of seven grooves, each cut in the shape of a crescent,—that is, without a bearing- or driving-edge for the bullet on one side, as in other systems of rifling. The twist makes one turn to the left in ten inches, being three turns in the length of the barrel, this severe rifling being considered necessary to steady the long missile in its flight.

Following are the specifications, as far as obtained:

Length of rifle, without bayonet	49.5 inches.
Length of rifle, with bayonet	?
Length of bayonet	11.8 "
Calibre	.303 "
Weight, without bayonet	9 pounds, 13 ounces.
Weight of bullet	215 grains.
Length of bullet	1.2 inches.
Point-blank	300 yards.
Highest graduation of sight	3500 "
Initial velocity with black powder	1830 feet per second.
Initial velocity with cordite	2250 " " "

The initial velocity with the service charge is sixteen hundred feet per second, but experiments with cordite have shown that this can be raised to two thousand two hundred and fifty feet. Practical tests have shown, also, that the mean deviation of the bullet at one thousand yards, which with the Springfield rifle is 21.4 inches, is a little over one foot, and forty shots can be fired per minute with ease and some deliberation when a spare magazine is carried, and with spare maga-

zines at hand, ready to insert, it has been fired at the rate of sixty shots per minute. This rifle was adopted a few years ago, previous to which the Martin-Henry, of calibre .45, a single-loader, was the arm of the English infantry.

Before adopting the gun offered by Mr. Lee it was subjected to many severe and some absurd tests, and so many modifications were made in it that the chief characteristics of the rifle disappeared, and as reconstructed it became known as the Lee-Burton. The objection to the box-magazine, which might be detached from the rifle and lost, was insuperable, and it was abandoned for a tubular under-barrel, slow-charging magazine, into which the cartridges were inserted singly, and in which they rested against each other in the tube, the point of the ball lying against the cap of the cartridge in front.

The most advanced of the gentlemen of the board and many officers of the army opposed this change, and after a great deal of controversy it was declared to be unsuitable, and the small-bore Lee-speed was adopted, with some modifications in the mechanism. The box-magazine was restored and chained to the rifle, the chain being attached to the guard-plate; a cut-off was supplied, and the box was enlarged to receive eight instead of five cartridges.

There was some opposition to the chain, because with it the magazine must always be carried on the rifle, and, as it cannot be recharged rapidly when dangling from the piece, a compromise was made by enlarging the capacity of the magazine to ten cartridges and retaining the cut-off, to enable the piece to be used as a single-loader.

Until recently a second or spare magazine was carried in a pouch on the waist-belt, but this was given up for no other reason than that it was an extra article of equipment, and liable to be lost.

A noticeable defect in this gun and in many bolt-guns is that great muscular exertion is necessary to operate the bolt with facility, especially in the withdrawal of the empty shell when the chamber is a little foul. This seems to be trifling when firing at leisure; but in some experiments made for rapid fire with the Lee gun in Arizona a few years ago it was found that this exertion was very fatiguing, and that in a long-continued firing, as in the defense of a position, a swelling and lameness of the right hand would follow. These defects have not escaped the observation of the English Commission on Small-Arms; but the rifle is considered an all-round satisfactory one, and has been adopted, although it is probable that both the chain and the cut-off in the magazine will finally be abandoned, and that in active service the spare box will be restored, or that a box and clip similar to that used with the German or Austrian rifle will replace the present box. In this rifle there are ninety-eight parts, and the cost of its manufacture is about twenty-six dollars.

THE GERMAN INFANTRY RIFLE.

About nine years ago all Europe was startled by the announcement that the German army was to be re-armed with a magazine-gun, and that one corps of the army would be armed with the new weapon at once.

It was given out that Mr. Mauser was the inventor of the new gun, and great results were promised from its performance.

When it appeared it proved to be a compromise model of the Remington-Keene type, a bolt-gun, having a fixed under-barrel tubular spring-fed magazine with a cut-off, and holding eight cartridges, and recharged by the slow process of inserting one cartridge at a time through a trap.

This is the original Mauser rifle of calibre .433. Three years ago the German government decided to adopt a rifle of a smaller calibre, to supersede the Mauser, and to make use of a smokeless powder, and it is expected that the rearmament will be completed this year.

Meantime, Belgium, Turkey, and Bulgaria, and the Argentine Republic in South America have adopted the Mauser, the calibre having been reduced to .301, some slight improvement made in the breech mechanism, and the magazine changed from a tube under the barrel to a box under the breech containing five cartridges,—the Lee box.

The box may be fixed or detached at pleasure, but is charged from above from the Mauser clip, a very simple contrivance, consisting of a strip of thin sheet-steel turned over at the edges sufficiently to allow the head of the cartridge to slide into it, where it is held by the flange and steadied in this position by a ribbon of steel under the head, which acts as a spring.

The clip may be emptied into the magazine by holding it over the mouth of the box and pressing the cartridges out with the thumb, a few seconds only being consumed in the process. The cartridges are elevated to the bolt by a carrier, or elevator actuated by a spring, as in the English Lee. The bolt is engaged with the breech on closing by a screw-thread in the forward end by a turn of the lever. The spring is coiled around the firing-pin within the bolt, and the empty shell may be extracted and a cartridge inserted in the chamber by four motions. The twist of the rifling is from left to right, with one turn in 9.8 inches.

The details of this gun are as follows:

Calibre	.301 inch.
Weight, without bayonet	8.6 pounds.
Weight, with bayonet	9.4 "
Length, without bayonet	50.2 inches.
Length, with bayonet	60 "
Weight of charge (smokeless)	54 grains.
Weight of bullet	216 "
Sight graduated to	1760 yards.
Initial velocity	2178 feet per second.
Gas-pressure	7.4 tons.

Although the magazine may be detached, it is habitually carried on the gun, and it can be quickly filled by hand, and the supply can be replenished by the insertion of single cartridges, as they are used, unlike the new German and the Austrian rifles, which can be used as single-loaders only when the clip is exhausted and ejected from the box. The bullet is of hardened lead covered with a German-silver jacket.

The gun has a metal cover for the barrel like the new German rifle, designed to protect the barrel from injury and the soldier's hand from heat in rapid firing.

This rifle is considered very superior to the English Lee. The cost of its manufacture is about sixteen dollars.

About three years ago, when the Germans decided to abandon the Mauser rifle, a contract was made with the Mannlicher Company for four hundred thousand stand, of a model somewhat resembling the Austrian Mannlicher. These were delivered last year, and since then the German manufactories at Spandau, Dantzig, and Erfurt have been producing rifles of this model at the rate of fifty thousand per month. The distinctive characteristic of the new rifle, which is known as the model of 1888, is that the true barrel is inclosed in an outer barrel of thin steel, leaving an air space all round between the two, which gives the weapon a massive and unwieldly appearance. The object of the outer barrel, which is simply an envelope, is to protect the hands of the soldier from the heat of the barrel in rapid fire and to obviate the difficulty found in accurate aim arising from the heat-waves from the barrel during firing. The outer barrel or casing carries the sights and the bayonet, and is united with the true barrel at the breech, but is open at the muzzle, where the true barrel projects a little.

The German officers have observed that in rapid fire the uniform expansion of the barrel is prevented by the bands, and that when in that condition accuracy of aim is impossible. To remedy this defect the bands have been removed from the rifle and a cover of thin metal has been placed around the barrel. The magazine is a modification of the Lee, a fixed box, and takes a clip somewhat like the Mannlicher clip, and containing five cartridges. There is no cut-off, and the rifle cannot be used as a single-loader until the magazine supply is exhausted, when, by pressing a spring placed inside the guard, the clip flies out through the mouth of the receiver, when a full clip may be inserted. The clip is made of light steel and costs two cents. The cartridges are rimless, but are cannelured around the base of the head, the groove fitting vertical projections on each side of the rear of the clip, but leaving them free enough to permit them to be raised freely in the clip by the elevator, and also enabling the extractor to grip them firmly, there being no projecting flange. The mechanism may be locked for safety when loaded by turning a stud on the left side.

In this gun the bolt is locked at the forward end just behind the chamber, two slots being cut in it, one below and the other above, into which two corresponding wings or lugs on the end of the bolt are turned when rotated by the lever. This gives the rifle a great superiority over the Lee-speed in the breech mechanism, and over any rifle that locks at the rear end of the bolt, because the amount of metal in both bolt and shoe may be greatly diminished, and this gives room for a larger and stronger spring, which I forgot to mention above is the weak point in the mechanism of the English gun, in which, it is said, breakage of the spring is very frequent during rapid fire. This rifle has another advantage over the English gun, and in fact over most other bolt-guns, which is considered a very important one. In the Lee, and in some other rifles, the spring is set at full cock by means of a catch attached to the firing-pin when the bolt is drawn back to extract the shell, and is held by a sear when the bolt is sent forward and until it is released by the trigger pull.

In the German rifle the bolt carries a cam, which is brought into contact with a stud connected with the firing-pin at its rear end when the trigger is pulled. When the bolt is rotated to open the breech the cam sets back the pin and retains the spring in compression until the bolt is sent forward and the breech closed. When the bolt is rotated back to lock it the spring is released by the bolt, but is held in tension by the sear until the piece is fired. The advantage claimed for this is that it enables the soldier to overcome the resistance in opening the breech and extracting the shell separately, and thereby minimizes the muscular exertion required to operate the mechanism.

An ingenious contrivance attached to the extractor, on the left side, and actuated by the lever when it is turned to open the breech, starts the shell from the chamber three-eighths of an inch, and in this position it is gripped by the extractor and withdrawn without resistance; and thus two important economic functions are performed by the simple acts of turning the lever to lock and unlock the bolt.

The breech mechanism is so simple that the whole thing can be dismounted and assembled by any one familiar with it without the use of tools.

Following are the particulars of this rifle:

Calibre	.311 inch.
Length, bayonet fixed	4 feet, 8 inches.
Weight, without bayonet	8 pounds, 4 ounces.
Weight, with bayonet	9 " 6 "
Weight of charge (smokeless)	42 grains.
Weight of bullet	224 "
Point-blank	300 yards.
Initial velocity	2050 feet per second.
Average number of shots per minute in aimed fire	18.

Experiments have shown that the bullet at three hundred and twenty-five yards will penetrate iron seven millimetres, and that at eight hundred and fifty yards the penetration of dry pine is twenty-five inches. At three hundred and thirty yards the bullet will make a clean hole through an iron plate a quarter of an inch thick, and at any distance up to about nine hundred yards at least thirty inches of earth is necessary to afford protection from it.

The cartridges are made up in packets of three clips each. The soldier carries two cartridge-boxes in front, each containing two packets, and one behind containing six packets,—in all one hundred and fifty rounds, weighing ten and one-quarter pounds.

Ammunition is transported in boxes of eleven hundred and twenty-five rounds each, weighing ninety-two pounds.

There are two rear sights on the rifle, the highest graduation mark being two thousand two hundred and fifty yards. From the point-blank up to eight hundred and seventy-five yards is the mid range.

Up to this point one sight is used, and one range is indicated by the commander. Beyond that the long sight is used and two ranges are indicated, differing by one hundred metres, the shorter range being indicated to the front rank; the result of the fire is watched, and the correction is made when the true range is determined.

Entire freedom is given the men on the firing-line, and a rest for the rifle is to form part of the equipment of the infantry soldier, the forms taught on the drill-ground being entirely ignored in action, that the individuality of the soldier may have a wider scope at the moment when his resolution and intelligence are put to their greatest trial.

Since the use of smokeless powder in the German army it is said that some defects have been found in the new rifle, the chief one being the insufficiency of the strength of the bolt to withstand the force of the high-power explosive, also that the metal covering of the barrel takes up and retains the heat, causing an unequal expansion of the true barrel and consequent injury to the rifling, and that in rapid fire, after twenty-five shots, the metal cover is so hot that it cannot be handled without burning the hand. The authenticity of these reports has not been established.

THE AUSTRIAN INFANTRY RIFLE.

After a long period of experiment the Austrian commission on small-arms adopted a rifle invented by Mr. Mannlicher, a civil engineer. It is a bolt-gun with an under-breech box-magazine of the Lee type, but fixed, and it is charged from above like the German rifle by the clip, containing five cartridges.

The magazine-box is a hollow frame of thin steel supplied with a bent rocking lever, which enters the bottom of the clip through a slot and raises the cartridges to the bolt. The clip, like that of the German

gun, is an essential part of the mechanism, and is inserted through the opening in the top of the box, in which it is held in a fixed position by a spring catch placed in the back of the box. When the clip is empty, pressure on the spring, which is placed in the front of the guard, releases it, and it drops out through the bottom of the box. This gun was designed for the use of black powder, but the introduction of smokeless powder made a change in the dimensions of the powder-chamber of the cartridge necessary, and a corresponding change in the chamber of the gun, the cost of which would be very great. It was decided on this account to retain the same size of cartridge-case, and add to the smokeless powder charge some neutral material to bring the volume up to that of the black powder charge.

The bolt has a straight forward and backward motion, and is locked without turning the lever, the locking being done under the bolt and out of sight by a hinged brace that falls in front of a strong recoil-block, and is securely held there by a quoin, which glides into a slot in the brace when the bolt is pushed forward, and presses upon it until it is released by the withdrawal of the bolt. When the bolt is drawn back, the quoin moves first, freeing the brace, which is lifted by the continuance of the backward motion of the bolt, when both quoin and brace slide back over the recoil-block to the stop. This movement also sets back the firing-pin and compresses the spring, which is held in compression by a sear until the gun is fired.

It is claimed that the straight forward and backward motion of the bolt enables the soldier to fire the contents of the clip from the shoulder without bringing down the piece, an advantage of a very uncertain value.

Following are the details as far as ascertained:

Calibre	.315 inch.
Length, without bayonet	50.4 inches.
Length, with bayonet	59.8 "
Weight, without bayonet	9.68 pounds.
Weight, with bayonet	10 pounds, 1¼ ounces.
Length of bayonet with grip	15.28 inches.
Length of bayonet blade	9.65 "
Number of grooves	4.
Weight of charge (compressed powder)	61.7 grains.
Weight of bullet	243 "
Length of bullet	1.25 inches.
Initial velocity	2115 feet per second.
Highest graduation of sight	1723 yards.

Since smokeless powder has been used the charge has been reduced to forty grains, and the bullet to two hundred and fifteen grains, which gives a higher initial velocity. The magazine has no cut-off, and the gun can be used as a single-loader only when the magazine is empty.

The cartridge now in use is headless, but a groove is cut around the base to enable the extractor to grip the shell.

The ammunition is carried packed in cases, two cases being wrapped together in a paper wrapping. The soldier carries ten packets, one hundred rounds, weighing 7.8 pounds.

At the experimental tests sixty shots per minute were fired with the rifle without bringing it down from the shoulder. The rapidity of aimed fire is said to be twenty-eight shots.

The bullet is of hardened lead covered with a steel envelope .13 of an inch thick. Its diameter is .007 greater than the diameter of the bore, and it has greater penetrating power than any small-arm projectile now in use. At an experiment made in Austria a few years ago with the Mannlicher rifle, with bullets jacketed with steel, nickel, and copper, and of hardened lead, the steel- and nickel-jacketed bullets passed through a target composed of three and one-half inches of beech backed by a steel plate nine-tenths of an inch thick, and penetrated three inches into the wooden backing behind the plate without being much deformed, while the hardened lead and copper-jacketed bullets were stopped by the plate. The bayonet of this rifle is of the poignard type, and is a formidable weapon either on the rifle or in hand. It has a total length of nearly fifteen inches, and is composed of the blade, guard, and hilt. One branch of the guard is formed into a socket into which passes the muzzle of the rifle, where it is caught and held by a spring which clamps it on the stud, from which it is released by pressure on a button placed near the end of the hilt. It is habitually carried in the scabbard.

THE FRENCH RIFLE.

So much has been printed about the new French Lebel rifle that many people believe it to be something extraordinary. It is the old Kropatschek rifle used in the French navy for a number of years, with the same complex mechanism and tubular magazine, provided with a cut-off for economy of ammunition, but with a new and more euphonious name, which belongs to the cartridge rather than to the gun.

The chief objection to this gun is that the magazine is a long tube under the barrel in which eight cartridges lie in a column, the bullet resting against the cap of the cartridge in front, which makes it necessary to protect the primer with a metallic cushion to prevent explosion by percussion in the magazine, which it is said to do without diminishing the certainty of explosion when struck by the firing-pin. Another objection is that the centre of gravity or "balance" of the gun is steadily changed while the magazine is being depleted by firing, and that accuracy of aim is thereby necessarily deranged. The slow and unhandy process of recharging the magazine is also objectionable, and

must make a well-sustained rapid fire impossible. The bolt and mechanism consist of fourteen pieces. The sword-bayonet is retained.

The following are the dimensions, weight, etc.:

Length, with bayonet	71.8 inches.
Length, without bayonet	51.4 "
Weight, without bayonet	9.2 pounds.
Weight of sword-bayonet with scabbard	1 32 "
Calibre	.307 inch.
Sight graduated to	2187 yards.
Muzzle velocity	2194 feet per second.
Weight of bullet	231.48 grains.

The explosive is a compound of which the proportions of the ingredients are not definitely known, but it is made of gun-cotton and collodion, and produces no smoke, very little noise, and but slight recoil. The penetration of the bullet in dry fir is, at five hundred and fifty yards 17.9 inches, and at thirty-two feet 35.4 inches. In packed earth, at five hundred and fifty yards the bullet penetrated 15.7 inches, at two hundred and ten yards 17.7 inches, and at thirty-two feet only 9.8 inches, the bullet being deformed by the high velocity at the short range.

The Lebel was the authorized rifle of the French cavalry also, but with a Lee box-magazine to hold three cartridges. Very recently this carbine has been discarded, and a new gun, known as the Berthier, brought out in France has taken its place in the cavalry. Eighty thousand of them are now being manufactured for that arm of the service, and it is understood that all the troops in France, infantry as well as cavalry, are to be armed with the new model, which in calibre and ballistics is practically the same as the Lebel, but with a much simpler breech mechanism and a box- instead of a tube-magazine.

Early information about an invention or an improvement in military small-arms or ammunition is very difficult to obtain, and generally the first reports of the details are more or less incorrect, except those coming from the Austrian Small-Arms Company, the manufacturers of the Mannlicher rifle, which publishes authentic statistics of the arms and ammunition produced by the company.

The most reliable information that can be obtained about the Berthier rifle is from a French source and one interested in the manufacture and sale of the weapon, and in brief is as follows:

The rifle is a bolt-gun of calibre .301, the rifling being in four grooves, with one turn in 9.45 inches. The depth of the grooves is .006, and the width double that of the lands. The diameter of the bore measured to the bottoms of opposite grooves is .313. The bullet has a diameter of .308, and is of hardened lead covered with a case of white metal .02 of an inch in thickness. The weight is two hundred and five grains. The charge is thirty-three grains of smokeless powder, which gives a gas-pressure of about fourteen tons per square inch. The

initial velocity is given at two thousand and seventy-one foot-seconds. With this charge a penetration of twenty-five inches in elm at one hundred and fifty yards was obtained, and a steel plate seven-thirty-seconds of an inch thick was perforated at the same distance. At experiments for accuracy perfect targets were made at five hundred yards with 40′ elevation, and at one thousand yards with 1° 30′ elevation. The magazine-box is of the Lee type, but the magazine proper is a tin clip, very much like that of the German rifle, and costs about one cent. It holds four cartridges, and is inserted in the box from above. In this position the cartridges are fed up to the bolt by a spring, as in other bolt-guns. When the last cartridge is pushed forward into the chamber, by touching a spring placed in front of the trigger the feeding-up spring is withdrawn and the clip drops out of the box.

The cartridges are supplied the soldier in the clip-magazines, and these are carried intact until used on a waist-belt, in leather pouches, one hundred rounds, weighing six pounds, one hundred and twenty rounds being the regular supply. The gun can be used as a single-loader when the magazine is empty by placing the cartridge on the carrier-spring in front of the bolt, and can therefore be loaded singly more rapidly than either the English, German, or Austrian gun. The contents of seven magazines, twenty-eight cartridges, can be fired with facility per minute.

In simplicity of mechanism this rifle is said to be superior to all other military rifles. The bolt mechanism consists of only eight parts, and by turning a clip placed on the left side of the piece the whole mechanism is free to be taken out to be examined or cleaned, it being the purpose to allow the soldier complete control of all the parts. The total number of parts in the rifle is sixty-three, against ninety-eight in the Lee-speed, and the cost of manufacture is twenty dollars, against twenty-six dollars for the English rifle. The weight of the rifle without bayonet is eight pounds and a half.

THE ITALIAN RIFLE.

Although the Italian government has recently decided on a change of the infantry rifle, the old rifle—the Vetterli-Vitali—is still in the hands of the troops. This is a bolt-gun, invented in Switzerland over twenty years ago. Some alteration was made in the rifle by Vitali, an Italian inventor, who also designed the box-magazine that has his name, and is somewhat similar to the box designed by Mr. Lee.

This magazine replaced the tubular under-barrel magazine of the original rifle.

The receiver is a fixed receptacle like that of the Mannlicher, but with a cut-off, and holds four cartridges. The box is charged from above from a card-board pocket in very much the same manner that the Mauser is charged from the steel clip. One million five hundred

thousand rifles were altered to take this improvement when work was suspended pending the question of adopting a new rifle.

The following are the specifications as far as they could be obtained:

Calibre	.405 inch.
Length, without bayonet	53.2 inches.
Length, with bayonet	73.6 "
Weight, without bayonet	9.48 pounds.
Weight, with bayonet	10.76 "
Charge (smokeless powder)	37 grains.
Weight of bullet	246.9 "
Muzzle velocity	2017 feet per second.

Rifling: four grooves, with one turn in sixty-three and a half calibres.

The sight is graduated to seventeen hundred and sixty yards. The chief characteristic is the low recoil. The bullet is covered with brass. The soldier carries ninety-six rounds of ammunition on his person and four in the magazine.

Last year the government finally decided to adopt a rifle of the Mannlicher system, a new gun brought out by the Austrian Small-Arms Company, and known as the model of 1891, having a calibre of 6.5 millimetres, or .256 inch, being one and one-half millimetres smaller than the calibre of the Mannlicher model of 1888.

This rifle and the Berthier, the rifle recently brought out in France, are the only rifles in Europe that have been designed for the use of the high-power smokeless powder now in general use. The strength of its mechanism and parts was accordingly determined on that basis, and in its construction Mr. Mannlicher gave application to the improvements suggested by his long and varied experience in designing and constructing. The chief of these being the farther reduction of the calibre to .256. There are two types of this gun, known as the Turino and the Carcano, the latter being the one preferred.

The bolt has the usual combined movement by which the breech is opened, the empty shell extracted, and the firing-pin set back at the same time by a turn of the lever, as in the German model of 1888.

The breech-box and the mechanism are similar to that of the German gun, but where the breech is united with the barrel the metal is two millimetres thicker than in the German model, and the barrel around the chamber or box is re-enforced to the same extent.

The bolt has a movable head differing from that of the German gun in not being counter-sunk to take the head of the cartridge. Both extractor and ejector are adjusted to the movable head. The bolt carries in front two locking projections, which by a turn of the lever are locked in corresponding slots in the breech-box when the breech is closed.

When the cartridge is taken from the magazine it is immediately

caught by the claw of the extractor, and a lodgment in the wall of the chamber permits the claw to enter and thus keep its grip on the cartridge head positive.

The ejector is independent of the locking wings, and while the bolt is drawn back the rear of the ejector is brought against a stop, by which it is thrown forward with force against the head of the shell, which is thrown out on the right side of the breech-case.

The mechanism has ten parts, and it may be dismounted and reassembled by any one familiar with the gun, and without the use of tools.

The magazine is in front of the guard, and is flush and continuous with it, and is fixed, but may be removed to be cleaned. The mechanism consists of three parts, and is the simplest in the system of magazines. The clip differs a little in shape from the clip of the Austrian gun, but it is practically the same thing, the change being one designed to diminish the friction in the elevation of the cartridges towards the bolt; and when the cartridge is elevated the clip falls to the ground through the opening in the bottom of the magazine. The barrel is not provided with the metal cover on the German gun, which may be considered evidence of the inutility of that addition. The bayonet is the poignard used on the Mannlicher, and is fitted to the gun in the same manner.

The weight without the bayonet is eight pounds eight ounces. The charge is 34.25 grains of smokeless powder. The bullet is of lead, antimony, and tin, covered with a jacket of copper, zinc, and nickel, and weighs 231.4 grains. The length of the cartridge is 2.22 inches, and its total weight is 331.75 grains, being over twenty to the pound, against nine of the Springfield. The shell is rimless.

The specific information given out about this rifle is very limited, and not much is yet known about its ballistics outside the Austrian Small-Arms Company and the agents of the Italian government. Other conditions being equal, the reduction of weight in this gun and its ammunition gives it a decided superiority over all other infantry rifles, for the soldier can carry with him into battle sufficient ammunition to make him practically independent of any other source of supply during the action.

THE SWISS RIFLE.

For about twenty years the Swiss infantry has been armed with the Vetterli rifle, a gun substantially the same as the Italian rifle, except that in the Swiss gun the original tubular under-barrel magazine was retained. It has a muzzle velocity of fourteen hundred and twenty-seven feet, and is sighted to seventeen hundred and fifty yards.

Two years ago a new model was brought out by Colonel Schmidt, director of the Small-Arms Factory in Berne, which has since been

adopted. One hundred and fifty thousand stand were ordered to be delivered, together with forty-five million rounds of ammunition.

Following are the details, obtained from foreign publications:

Calibre	.295 inch.
Weight, without bayonet	9.48 pounds.
Weight, with bayonet	10.5 "
Number of grooves	3.
Twist, one turn in	10.6 inches.
Weight of charge	81 grains.
Weight of bullet	216 "
Initial velocity, about	2000 feet per second.
Gas-pressure	14.4 tons.
Extreme range	3281 yards.

The bolt and mechanism are inclosed in a casing, the bolt-handle projecting on the right side. The bolt-action is straight forward and backward, but a motion of rotation is given by two curved grooves inside the casing, into which two corresponding locking-lugs enter. The mechanism is complicated and difficult to describe. The barrel is covered by the stock nearly to the muzzle.

The magazine is of tinned sheet-iron, and holds twelve cartridges placed in two vertical columns, as in the Lee-speed magazine, and is fitted to the rifle a little in advance of the trigger-guard, but can be removed when necessary to clean it. It is charged while on the gun, from above, from paper packages or clips, containing six cartridges each, and is supplied with a cut-off. The rear sight is graduated in one-hundred-metre distances from three hundred to two thousand metres. The soldier carries one hundred and sixty-four rounds of ammunition, twenty rounds being carried loose in a haversack for single fire. No other reliable information about this gun can be obtained at present.

THE RUSSIAN RIFLE.

The Russian infantry is still armed with the Berdan single-loader, a bolt-gun, in which the Russians have great confidence, and with which they did some great things in the war with the Turks, who were armed with the Martini-Henry, also a single-loader.

The Berdan has a calibre of .42, and weighs nine pounds four ounces. The charge is seventy-seven grains black powder, and the bullet weighs three hundred and seventy grains.

The rifling is in six grooves, with one turn in fifty calibres. The muzzle velocity is fourteen hundred and forty-four feet per second, and the piece is sighted to eleven hundred and sixty-five yards.

Very recently a new rifle has been adopted, designed for the use of a smokeless powder, and of a calibre to take the Lebel cartridge. Last year an order was sent to France for the manufacture of three million stand of the new gun, and these are now being turned out at St.-Étienne and Châtellerault at the rate of one hundred thousand per month, and

four hundred and thirty thousand will be made annually in the empire, the whole to be turned out by July, 1894.

The rifle is to have a detachable under-box magazine of the Lee type, to hold five cartridges.

The information about this gun made public is as follows:

Calibre	.30
Weight	9 pounds.
Length, with bayonet	68 inches.
Number of grooves	4.
One turn in	68 calibres.
Initial velocity	2034 feet per second.
Maximum range	3888 yards.
Sighted to	2335 "
Bullet	Lead and antimony.
Weight of bullet	213.86 grains.
Jacket	copper, zinc, and nickel.
Charge	33 grains smokeless.

THE SPANISH RIFLE.

The infantry of Spain is armed with the Remington rifle, model of 1871, a single-loader with a segmental block to close the breech, instead of a bolt. It is the only rifle in Europe except the Martini-Henry without a bolt mechanism.

The calibre is	.433 inch.
Charge (black powder)	77 grains.
Weight of bullet	386 "
Muzzle velocity	1640 feet per second.
Sighted to	1100 yards.
Weight	9 pounds.

It is understood that the Spanish government is engaged in converting this rifle to a smaller calibre and to use smokeless powder, and that the magazine will be of the Lee model.

THE PORTUGUESE RIFLE.

The Portuguese infantry is armed with the Kropatschek rifle, which has but recently been converted from calibre .433 to .315. It has a tubular under-barrel magazine, like that of the Lebel, which takes nine cartridges and has a cut-off.

The following are the dimensions and weights:

Length of rifle	52 inches.
Length of sword-bayonet	18.5 "
Weight of rifle, about	8.5 pounds.
Weight of sword-bayonet	1.21 "
Number of grooves	4.
Pitch of grooves, one turn in	11 inches.
Weight of charge	69 grains.
Weight of bullet	246 "
Muzzle velocity	1760 feet per second.
Graduated to	2187 yards.

The bullet is of compressed lead covered with a copper envelope, and is of the same diameter as the bore. The rapidity of aimed magazine-fire is fifteen shots per minute, of unaimed fire thirty shots. The actual rapidity of aimed continuous magazine-fire is much less than fifteen, since it takes thirty-six seconds to exhaust the magazine aiming, and thirteen seconds to reload it. The cavalry carbine is of the same model.

THE DANISH RIFLE.

Two years ago the Danes gave up the Remington and adopted the Krag-Jorgensen rifle, a bolt-gun of calibre .315, weighing nine pounds eight ounces, with a fixed bolt under and curving up to the left side of the receiver, where the cartridge drops in, in front of the bolt. The magazine contains five cartridges, which are fed into it from a tin clip through an opening on the right side and under the breech-casing. This aperture is closed by a strong sheet-metal door, and is pivoted to the magazine by a screw at the forward end which permits it to open with the motion of a hinge, to the right. When closed it is clamped by a spring-catch. In a recess within the door is placed a strong spring, actuating a lever and carrier, by which the cartridges are elevated to the mouth of the receiver on the left side. A cut-off permits the piece to be used as a single-loader. The magazine may be charged by hand or from the clip.

The charge is seventy grains of black powder, and the bullet for this charge weighs two hundred and thirty-five grains and is jacketed with copper. The rifling is in six grooves, with one turn in 11.8 inches. The length of the gun is 4.35 feet, and the barrel has a metal cover like that of the German rifle. The muzzle velocity with black powder is seventeen hundred and seventy feet per second. With a smokeless powder, made in Denmark for use with this rifle, 33.9 grains gave a bullet of 237.6 grains a muzzle velocity of nineteen hundred and sixty-eight feet per second, with a pressure of 16.4 tons per square inch.

THE RIFLE OF SWEDEN AND NORWAY.

Sweden and Norway, following the other nations in their improvements in small-arms, decided last year to adopt a rifle of small calibre and smokeless powder, and have transformed the old Remington, a single-loader, of calibre .433, to a calibre of .315, retaining the segmental breech-block, with some modification giving it greater strength.

The following are the details of the gun as altered:

Length, without bayonet	49 inches.
Length, with bayonet	68.1 "
Weight, without bayonet	8.82 pounds.
Weight, with bayonet	9.59 "
Number of grooves	6.
Twist, one turn in	11.34 inches.

Weight of bullet	231.45 grains.
Weight of charge (compressed black powder)	72.52 "
Muzzle velocity with this charge	1755 feet per second.
Gas-pressure	12.5 tons.
Weight of charge, smokeless powder (Grakrut)	48.6 grains.
Muzzle velocity with this charge	1965 feet per second.
Gas-pressure	14.7 tons.

The Grakrut smokeless powder has been adopted for the new gun; but until a sufficient supply of the new arms is turned out the army will keep the rifle now in use, the Jarmann, a bolt-gun, with a tubular under-barrel magazine, of calibre .397, with four grooves, having one turn in fifty-five calibres and an initial velocity of fifteen hundred and thirty-six feet with black powder seventy-seven grains and a bullet of three hundred and thirty-seven grains.

The armies of Holland and Roumania are to be armed at once with the new Mannlicher, model of 1891, described above as the rifle of the Italian infantry. The Dutch have adopted it also in their navy and for their colonial troops. The infantry of Holland is at present armed with the Beaumont rifle, a modification of the French Chassepot, the tubular magazine having been superseded by the Italian Vitali box with a cut-off. The calibre is .433. The magazine is filled from above either by hand or from a clip containing four cartridges. Each soldier carries one hundred rounds, including four in the magazine.

The Roumanians are now armed with the Martini-Henry, a very effective weapon in its day, a single-loader, with a falling hinged block, a calibre of .45, and having a muzzle velocity of twelve hundred and fifty-three feet per second.

THE HEBLER RIFLE.

The rifle perfected by Professor Hebler, referred to above, the principles of which have been adopted by all European nations, is a bolt-gun on the Lee system, weighing nine pounds fourteen and one-half ounces, and is a single-loader, of a calibre of .296 inch. The rifling is in six grooves, with one turn in fifteen and one-half calibres. The charge is eighty-three grains of black powder, compressed in the shell. The bullet weighs two hundred and twenty-five grains, the total weight of the cartridge, which includes one grain of lubricant, being five hundred and twenty-one grains, or thirteen and one-half to the pound. The rifle has a muzzle velocity of nineteen hundred and sixty-eight feet, and is sighted to two thousand eight hundred and forty-three yards.

Apart from the small calibre and the rapid twist of the rifling, the chief factor of efficiency abides in the cartridge.

The shell consists of two parts,—a cylindro-conical steel case 2.36 inches long, nickel-plated inside and out, to prevent rust, and a copper head, in which the primer is fixed, and which is inserted in the cylinder

to the extent of nearly half an inch, and which, by slight expansion, acts as a gas check. The powder is compressed in the shell, and has a hollow space through the centre, widening towards the base of the bullet, to give an extensive burning surface from the instant of ignition. The bullet is 1.32 inches long, and is made of ninety-seven per cent. lead hardened with three per cent. of antimony, and has a steel jacket, nickel-plated. Its diameter is .008 of an inch greater than the diameter of the bore, to insure a perfect grip of the rifling. It is fitted into the conical end of the shell in such a way as to leave a space of one millimetre between its base and the charge. The maximum gas-pressure developed is 7.32 tons to the square inch. The penetration of the bullet is very great, being double that of the old Mauser at all ranges.

Except the Hebler, only the rifles that have passed the experimental stage and been adopted in the European armies have been described in this paper, and at these we have had but a casual glance, but sufficient to enable us to see that each of the European nations, following its own methods and pursuing its own investigations on the question of the best and most effective military small-arms and ammunition, has reached substantially the same conclusion; that the Germans and Austrians are, scientifically and practically, somewhat ahead of the others on this important question, and that the other nations are following on the same lines as rapidly as their material and resources will permit.

Also, that the smaller and weaker nations, whose existence depends on the preservation of the balance of power, are as active in this death-dealing industry as the great powers are. The result of this must be that in a few years every nation in Europe will be a permanent camp, in which the whole arms-bearing population will be available for service when the great war for supremacy comes to be fought.

Some of these rifles have been fired at the rate of sixty shots per minute at their tests, the magazine being replenished without removing the gun from the shoulder, and with accuracy at from eighteen to thirty shots per minute in the hands of troops.

It is not rapidity of fire for a brief time, however, that is the desideratum, but quick renewal of the magazine supply, by which rapid fire may be maintained for a prolonged period, and it is thought on that account that the Lee box-magazine, or one of that type with a clip-feed, is destined to supersede all other magazine systems, and that the coming magazine will be detachable or provided with some automatic contrivance by which the soldier, in the excitement of rapid fire, will be apprised of the exhaustion of the supply in the receiver; for at such times many men do not know whether the gun is fired or not. On every great battle-field of the Civil War some thousands of muskets were found with two or more loads rammed down on top of each other. On the field of Gettysburg nearly twenty-five thousand muskets were

picked up by the Ordnance Department, each having several loads in it, some as many as ten.

It appears, also, that the reduction of the calibre is the chief factor in raising the velocity, and thus enlarging the shot-swept area, for the English with the small-bore Lee rifle have attained a muzzle velocity of sixteen hundred feet with black powder, and in recent experiments with the same rifle a velocity of eighteen hundred and fifty feet, and with cordite powder over two thousand feet. It is now practically settled that the maximum in both range and accuracy is attained with a calibre of about .30, and that a calibre exceeding .315 gives a sensible diminution of the accuracy though the range may be the same.

No data on the trajectories of these guns can be obtained at present. These have been worked out on velocities and weights of projectiles, but the coefficients of form and friction are known only to those who made the experiments and the calculations, and this information is carefully guarded.

There will be changes in the ballistics, of course, as the quality of the explosive is improved, and it is not improbable that something new will be discovered that will modify the present theory, as the old theory of recoil has been modified. The theory that the recoil was derived from the combination of the weight and velocity of the bullet, and that the energy exerted in driving it was equal to the recoil of the piece, whether derived from a swift-flying bullet of small calibre or a slow-flying bullet of large calibre, has been proved by scientific inquiry to be erroneous, and this has been confirmed by practical experience; for the muzzle energy of the small missile leaving the French, German, or Austrian rifle is one-third greater than that of the large bullet leaving the Springfield rifle, while the recoil is more than one-third less.

Of the chemical compounds used as explosives in the French and German rifles definite information cannot be obtained. When the Lebel rifle was adopted a smokeless powder was made for it, the principal ingredients of which were picrate of ammonia and nitrate of potash. This gave a velocity of over two thousand feet, and was so satisfactory otherwise that millions of cartridges were made and stored at Châlons for possible use. A year afterwards when the ammunition was inspected it was found that the powder had undergone decomposition and the supply had to be condemned. The French are now using a composition of gun-cotton and collodion, made up in fine pellets, and is smokeless. The German compound, whatever it is, is also made up in pellets, and gives off on combustion a thin vapory haze, which quickly disappears.

The swift-flying elongated bullet used in these rifles requires rapid rotation to steady it in its long flight, and lead was found to be too soft to stand the rapid movement and spin in the bore, even when hardened

with antimony. It became necessary, therefore, to cover it with a material that would take and keep the rifling and leave the grooves clean. Copper and nickel were tried in England and France for this purpose, and nickel was preferred, as giving the better results.

In Germany, after many experiments with various metals, German silver has been decided upon as the most suitable, and is now used exclusively.

In Austria steel has been adopted as giving the greatest accuracy and penetration. The bullet is made by drawing the jacket to shape from a disk. It is then plated inside and out, filled with hardened lead and subjected to a heat that solders the two together, and when cool it is swaged and cut to size. At the point, where the metal of the jacket is thickest, it is tempered, or hardened, but the sides are left malleable enough to take the grooves. The penetration of such a bullet is something extraordinary. At two hundred and twenty yards the Lebel bullet penetrates eleven inches of solid seasoned oak, and the German bullet makes a clean hole through a steel plate nearly one-half inch thick, near the muzzle.

It is apparent that the chief reliance of the English and French is on the large supply of ammunition reserved in the magazine, the rifle being used as a single-loader up to the moment of rapid fire.

It is apparent also that when the magazine supply is exhausted the efficiency of these rifles falls far below that of the Germans, Austrians, and others, for the reason that the slow method of recharging the magazine will reduce the average rate of fire to that of the single-loader, or even lower, while the well-sustained fire of the German gun, the Mannlicher or the Mauser, and other rifles having the clip system of feed, will, at all times, give a preponderance of missile force over the slow-charging weapons.

The immense superiority of all these rifles over the Springfield is apparent from recorded statistics of their rapidity of fire, their long range, and their accuracy, as well as their low trajectory, which puts the point-blank at about three hundred yards instead of one hundred, and more than doubles the dangerous space at all ranges up to a mile, while the soldier is able to carry more than twice the amount of ammunition borne by the American soldier. The regular supply of ammunition for an army corps of thirty thousand men going into action would be about four million five hundred thousand rounds, being more than four times the amount expended by the Army of the Tennessee in two days' fighting at the battle of Shiloh. Consideration of these conditions gives rise to reflections on the subject of fire discipline, which need not form part of this paper, except so far as to say that the side that has the largest supply of ammunition available for close-range fighting will be the most likely to hold the ground, and that rapid fire, except upon an advancing or retreating enemy at short range, is a waste

of ammunition and of physical force that cannot be repaired until the action is at an end.

At an experiment for rapid fire recently made in France, a target representing fifteen men, standing a few inches apart, was erected three hundred and twenty-seven yards from the firing-point, at which ten soldiers fired an average of 154.2 shots, kneeling, with as much rapidity as was consistent with aim. Behind each man firing stood another, with a rifle, to exchange with him when the heat of the barrel became so great as to be unendurable. Between the twentieth and twenty-fifth shots the rifles were heated to such a degree that they could no longer be handled, and at the end of ten minutes the men were obliged from physical exhaustion to stop firing. An average of only 8.6 per cent. of hits were made. This is one of many instances that may be cited to prove that individual fire on the line of battle, especially of inexperienced infantry, is not as effective as group or mass fire under intelligent direction and proper control, even at short ranges.

A paper on the subject of modern small-arms is necessarily incomplete without some account of the high-power explosives now in general use in Europe. The number of these powders is so great that even a brief notice of each cannot be taken without a much greater extension of this paper than convenience will permit.

At first these powders were nearly all made with a nitrate base. It was soon found that exposure to the atmosphere or to a high temperature caused deliquescence and deterioration of the compound, and that dangerous and uncontrollable pressures, with irregular velocities, resulted from the change. More stable compounds are now used, but, except in a few instances, the ingredients and composition are undetermined.

The requisites of a powder suitable for the new model small calibre rifles now in the hands of European troops are smokelessness, perfect combustion, a high and steady impulse to the bullet, and moderate and uniform gas-pressure, also stability under varying conditions of temperature, and freedom from noisome gas on combustion. Captain Noble of the English army has brought out a compound which very nearly meets these requirements. At three hundred yards a volley from a company of fifty men using this powder was scarcely heard, and the faint haze from the powder disappeared in a few seconds. This compound is known as *cordite*, for the reason that in its manufacture it is subjected to hydraulic pressure, during which it assumes the form of whip-cord. This powder has been adopted by the English for small-arms, but is not yet in general use. Some tests of all the best European powders very recently made by a commission of officers of the Turkish army in Constantinople resulted in the selection of the Austrian powder and its adoption by the government.

In the United States at present a great deal of attention is bestowed on this subject by a few chemists, and some powerful powders have been

tested recently at the National Armory. The most satisfactory of these are a powder offered by Mr. Hudson Maxim, composed of seventy-four per cent. of gun-cotton, twenty-five per cent. of nitro-glycerin, and one per cent. of castor oil; and a compound, the exact composition of which is unknown, submitted for trial by Mr. W. B. Houghton, of North Adams, Massachusetts.

In the Springfield experimental pressure-barrel thirty-seven grains of the Maxim powder gave a bullet of two hundred and thirty grains, in ten shots, a mean initial velocity of 1992.6 feet per second, with a mean gas-pressure of fifty-one thousand five hundred and seventy pounds. The Houghton gave in eight shots a mean velocity of 2049.5 feet per second and a gas-pressure of fifty-six thousand two hundred and seventy-five pounds.

It is apparent, therefore, that with the adoption of a rifle with a smaller calibre than .45 the black powder will have to go, unless, like the rifle, it is protected by an act of Congress, even if the much-cherished Springfield is retained as the arm of our infantry. It has disappeared from Europe, both ashore and afloat, except in England, where the conservatives appear to be unwilling to part with it, probably for some reason analogous to the reason given for chaining the magazine to the rifle.

When the potential forces that are now available for warfare are directed on the battle-field of the future with intelligence and skill, the devastation that will be wrought upon the area covered by the conflict and its environment will surpass anything of the kind known in former wars. Conditions and necessities now unknown and inconceivable will press upon the victorious and the vanquished alike. The number of wounded will exceed enormously that of any war heretofore, and the non-combatant auxiliaries, hitherto safe in any shelter behind the close formations, will be compelled to contribute their quota to the mortality and casualty list or abandon their sphere of action, for the penetration of the steel and nickel-clad missile is so great that outside the fortified positions on the field there will be no place of safety within a mile of the battle front.

William E. Dougherty,
Captain U.S.A.

THE STORY OF A RECRUIT.

THE Seminole Indians in the southern part of Florida were on the war-path. Troops were ordered to concentrate at Tampa, where an expedition was being organized to take the field against them. Recruits were wanted to fill up Uncle Sam's depleted ranks. Here was an opportunity to win rank, honor, and fame. I went to a recruiting-officer and offered myself as a candidate for admission into Uncle Sam's service. Although a minor, I managed to overcome the scruples of the officer through the assistance of his sergeant, who had previously posted me in regard to age. I was then sent to Governor's Island, and donned the "army blue." After a short course of squad drill I joined a detachment of recruits under orders for Florida. We embarked on a sailing-vessel for Tampa, and after encountering heavy storms off Cape Hatteras and in the Gulf of Mexico, we arrived at Tampa. A day's rest was given us, then the march was taken up for the interior, to the camp of the company we had been assigned to, and arrived on New-Year's day, 1850, I feeling tired, weary, and foot-sore.

The next morning we were marched to the tent of the captain, who was pacing back and forth in front of it with one hand behind his back, holding a descriptive list. He was waiting to have a look at his new recruits.

The calling of the names and inspection over, he made a few brief remarks, to the following effect: "Those who merit good treatment shall have it; and those that do not merit it will surely catch the devil," and with this gentle reminder we were dismissed.

Although a recruit, I was naturally curious about the officer to whose fostering care Uncle Sam had transferred me. During the inspection he impressed me as being somewhat of a martinet.

He was about fifty years of age and over six feet high. His face was covered with a stubby beard and moustache,—not much of the face to be seen except the nose and sharp blue eyes looking sternly from under heavy eyebrows. He wore a faded and well-worn uniform, coat buttoned up to the chin, and underneath a high stock. The shoulder-straps were in keeping with the coat, on which were faded gold leaves (brevet major) that he had won in Mexico. His long legs were encased in tight-fitting, coarse, blue pants, that were so short as to expose

the gray stockings under a pair of number twelve army shoes the color of the sandy soil he stood on.

The "devil" was the most emphatic word I had ever heard him utter, and with all his apparent sternness, I found him to be a kind, just officer.

He was a Georgian by birth, a graduate of West Point, and in after-years held high rank in the Confederate army. And, in after-years, one of those recruits became captain of the same company (C, Seventh Infantry). Yes, rank, and the honor it carries with it, was won.

The first lieutenant of the company was on special duty as regimental adjutant. Staff duties of regiments were then performed by lieutenants detailed from companies, and with this exception and that of recruiting service, all officers were with their companies. The last-named duty was reserved for first lieutenants only.

The second lieutenant (Henry) was an old-time disciplinarian. I often thought the captain had him on his mind when he was cautioning some delinquent to "beware, or he would surely catch the devil." Lieutenant Henry was once a recruit, having been promoted from the ranks for conspicuous bravery in the Mexican War. The regiment was at Point Isabel (now Fort Brown) when it was bombarded by Mexican troops. The stars and stripes were flying defiantly on the flag-staff. A shot from the guns of the enemy cut the halyards, and the flag fell to the ground,—an ill omen for the brave commander, Major Brown, who fell soon after mortally wounded. Henry, who was then a sergeant, sprang forward and picked up one end of the halyards, climbed the staff in the midst of a storm of shot and shell, rove them, and hoisted the flag after descending.

Four or five years after, Henry got into some trouble and resigned, went to Nicaragua with Walker, the filibuster, and returned to New Orleans with a wooden leg.

The camp was situated on an elevated pinery on the bank of a creek. The command consisted of a battalion of two companies under the senior officer,—the captain of my company. The officers' tents were wall, of the same pattern as are now in use, and the company tents common A, pitched or raised on log frames about three feet high, with plenty of space between them for ventilation.

A smooth-bore musket with twenty rounds of buck and ball cartridges and equipments was issued to each of us. We were then turned over to the tender mercies of Sergeant Maloney, who put us through a course of drill in accordance with the prescribed tactics of "Scott." The sergeant was a stern old veteran, tall, gaunt, and as straight as a ramrod. He had a peculiar way of fixing the attention of the squad by giving a wrong or catching command occasionally; whether intentionally or not, it was all the same to us, causing a slight misunderstanding that brought forth from the sergeant a few forcible

remarks not in the "manual of arms," and a warning "never to obey a wrong command." With all of his peculiarities he was a brave soldier and a model of precision. He had been awarded a medal of honor for bravery in the Mexican War, and was as proud of the medal as if it had been the star of a brigadier-general.

Having become proficient in the "manual of arms," and mastering the complicated motions of "loading in nine times," I was assigned to a place in the rear rank of the company, and told to "keep it until the next batch of recruits joined, or otherwise ordered." I did not grumble,—to grumble would be infringing on the rights of veterans. I was soon made to understand that recruits were only to be seen, to obey, and but seldom heard, and, if I mistake not, a little of the same feeling existed among officers, all in the interest of discipline.

Although it was mid-winter, the days were pleasantly warm, but after sunset it became quite chilly. When retreat was over we congregated in groups around camp-fires in rear of the tents. Quite a number of the older soldiers had served in former campaigns against the Seminoles, and I believe nearly all had served in the Mexican War. One evening I went from group to group to hear and see what was going on, and finally came to one sitting around a bright pine-knot fire smoking their pipes and fighting their battles over again; from the battle of Palo Alto, under General Taylor, and from Vera Cruz, under General Scott, to the capitulation of the City of Mexico. One veteran told of the capture of the wife of an army officer by the Seminoles. As told: "She had been visiting her husband, and returning to Tampa under the protection of a small military escort. The Seminoles fired on the escort from an ambush, killing all of the soldiers but one, who had been wounded and allowed to live to tell the tale of woe." Montgomery, I think, was the name of the lady mentioned.

Stories were also told of sentinels having been found dead on their posts at night, their bodies covered with arrows of the stealthy savages. They were skilled in the art of imitating the hooting of owls and the cat-like cry of panthers. While one or more were imitating the birds or animals, so as to attract the attention of a sentinel, others would be crawling as noiseless as snakes to their unsuspicious victim and strike him to the earth with tomahawks, and complete the act silently with arrows. By this time the pine-knots began to flicker and smoulder. The call for tattoo sounded, which ended the stories for that night. I had been an eager and attentive listener, and felt that some of the stories were not of a very encouraging nature to a young and inexperienced recruit. Nevertheless, I learned something of the life and duties of a soldier not found in army regulations nor in tactics. After roll-call I went to my tent and couch, the latter not very inviting,—a soft place in the sandy soil, made softer by adding an armful of palmetto leaves; a blanket folded in two, one-half under, the other over, with

my knapsack for a pillow, on which I slept the sleep of the just, if not contented.

In the regular army a company of soldiers was generally composed of all classes of men, some well educated and others not so well. Men of many nations, trades, and vocations. It is curious to observe how these elements or different natures harmonize. Discipline is alike for all, but felt more keenly by the vicious and dissipated. Water seeks its level, and in time finds it. The same may be said of men in all stations of life. In the army the congenial become comrades and friends through thick and thin, and often during life.

In the hour of peril many of the ante-war soldiers were qualified to command companies, regiments, and brigades. The close of the war found those who survived it holding rank and commissions in the regular and volunteer service. A glance at any of the old army registers shows it. Although many of them have passed away, we still find quite a number on the retired list, and a few remain in active service,—some of them field-officers, and others stand close to that rank. Not only in the line, but in some of the staff corps we also find officers who were in the ranks previous to the war. Their experience in Indian warfare and strict school of discipline prepared them for any position in the line of the army. This was the only school at that time, except tactical. It was presumed men over twenty-one years of age had finished their education before coming into the army in any capacity.

Meantime, we were ordered to break camp and march to Fort Meade; and from there to continue the march in a southern direction, following the course of Pease Creek (now Peace River), which empties into Charlotte Harbor. The march from Fort Meade was necessarily slow, having to cut a wagon-road through cypress swamps and ever-changing forests of pine, large water-oaks, palmettoes, and magnolia-trees,—all shrouded in masses of drooping Spanish moss, so dense in places as to obscure the light of the sun. We found limes, and groves of wild orange-trees bearing fruit and blossom; very tempting to look at, but to the taste no better than an unripe persimmon. A kind called "bitter sweet" was palatable, but hard to distinguish from the sours until tasted. Fragrant jessamines, crèpe myrtles, and many other sweet-smelling plants and flowers were in profusion.

The songsters of the woods were there in numbers and varieties, the mocking-birds leading in a medley of song, their trilling notes ringing higher and higher in mockery of less-favored singing-birds.

Deer, turkey, and smaller game were plentiful. So were alligators, panthers, snakes, and scorpions.

Florida was surely the Seminole's paradise,—their "happy hunting-ground." Game in the woods and fish in the lakes, creeks, and bays,—nature providing all necessaries of life without labor. No wonder it

cost thousands of lives and millions of dollars before they were obliged to leave and go West to the Indian Territory.

How well I remember my first tour of guard-duty, and how I felt after being posted as a sentinel at midnight! It happened to be a post most distant from the guard, covering a flank of the camp. The night was dark and made still darker by the dense foliage of the trees. I was pacing my beat, keeping my eyes and *ears* open, and at the same time memorizing my orders. Owls commenced hooting near by, and at a distance I heard the cat-like cry of a panther, which was repeated nearer and nearer. I also heard the rustle of leaves on the trees, then on the ground. I stood as motionless as a statue,—my hair stood on end. The old soldier's story crossed my mind. I held my musket tighter and tighter ready to fire. In every flash of the fireflies I imagined that I saw eyes glare and glitter in the dark thicket beyond. I dare not fire; if it proved to be a false alarm I would surely be court-martialed. While undergoing these trying emotions I heard a sentinel call out the hour, and repeated by others in succession. This brought me to a sense of duty, and I called out, "Number 4, one o'clock, and all's well." Thus the voice of man silenced the owls and the panther.

I had fallen a few degrees in my own estimation, and mentally resolved never to get rattled again under such circumstances.

Well, it sometimes happens that the best resolutions of men fail, particularly soldiers. Mine did, and I may as well tell it now. About a year after the incident just related I was out on the Western plains. The command that I belonged to had been ordered to settle some trouble with the Arapahoe Indians. I was on a detached guard and a sentinel on post guarding a beef-herd. The night was calm and starry. The herd was resting and "chewing the cud of contentment" after feeding on sweet prairie grass. Everything around me was so still and quiet that I dropped into a musing mood. Suddenly my musings were brought to an abrupt and startling end by a thrilling and prolonged howl, that was taken up by hundreds of others, such as I had never heard before. I thought, "It must be Indians trying to stampede the herd," as quite a number had been at our camp that afternoon. I was carrying a sabre with which I made a few cuts (not in tactics), and quickly returned it to the scabbard as a useless weapon, and as quickly raised a short musket that had been hanging at my right side by a belt over the left shoulder; with a finger on the trigger I stood in defiant expectation of being stricken down in the dark, or trodden down by the stampeding herd. Minutes passed, and yet there was no commotion in the herd, only a few of the cattle moved from their resting position. The howling died away into short, snappish yelps, similar to dogs in a fight. Finally, it dawned over my bewildered mind that a steer had been killed that evening for issue to the troops. A pack of coyotes had got on the scent of it and were devouring the refuse regard-

less of my presence; they fought over it as only hungry coyotes can fight; they not only devoured the refuse, but they devoured each other. In the fight, the weak and mangled succumbed to the strong and powerful. The next morning I found remnants of their skin and bushy tails on the ground.

I said that I had a sabre and a short musket. At that time I was a "galvanized dragoon," or, in other words, an infantry soldier mounted on a horse, and armed with a heavy sabre and a short muzzle-loading piece called a "musketoon." In cases of emergency, when dragoons were not convenient, infantry were on special occasions mounted and equipped, as stated, and sent out to do a little dragooning after Indians. I would say more about my experience as a dragoon in the West, but it should be remembered that I have not been relieved off post yet, and will go back to the "land of flowers."

Soon after the "owl and panther" incident, I heard steps approaching from the interior of the camp. In response to my challenge it turned out to be the "relief,"—a great relief, too, not only in person, but to my mind after the ordeal I had passed through.

Many things happen in the life of a soldier to keep him on the alert besides Indians and the bullets of an enemy.

The custom of calling the hours in the field at night has virtually ceased. Of course there are times and places when it would be a military crime to make any noise in a camp, or on the march, even to make a fire or light a match. At some of our Western forts we still hear the cheery calls of sentinels singing out the hour in the cold, clear, midnight air. The "All's well all round" of number one keeps them on the alert; and in memory carries me back to by-gone days.

The march, although slow (for reasons given), was maintained and conducted on the same military principles as exist at the present time for a small column of infantry. It was pretty well known that the Seminoles were in the Everglades, although Indian-like, they were liable to strike when least expected. Old signs of their trail were found, but no sooner found than lost in the swamps; all leading in the direction named. Thus the march was continued until we arrived at Charlotte Harbor, where we rested a few days awaiting a steamer from Tampa. During the march there was a good deal of sickness, principally ague. Quinine mixed with whisky was the usual prescription, which proved to be very effective. Of course, those that did not like the whisky part could have water instead, but I believe all took their medicine as prescribed.

Meantime, the steamboat arrived with a detachment of troops on board; after we embarked, it proceeded down the harbor to St. Joseph's Island (now Pine Island), and increased our forces by taking aboard a portion of the troops that had been stationed there, and then steamed across the harbor and on up the Caloosahatchee River to a designated point, where we anchored in the channel for the night.

At early dawn the next morning row-boats were manned with detachments and started in line for the left bank of the river. As the boats touched ground we were ordered to jump out and form line; then deployed as skirmishers, advancing cautiously through a dense thicket of brush and palmettoes, expecting at each step to be fired on. After advancing some distance we were halted and re-enforced by a second line; the boats by this time having landed all of the troops. The soldiers not on the picket-line were provided with axes and such other tools as were necessary to clear off ground for a camp and hewing trees for a stockade. At that time it was considered very essential that a soldier should be as expert with an ax as with his musket, and many of them were, but I must confess that I was not of that number. I never could get the hang of an ax,—that is, to strike twice in the same place. Nevertheless, I was made useful in other ways. The life of a soldier was far from being an idle one. He was generally on the move, and lived most of the time under a canvas roof; when not in the field he was building huts or temporary winter-quarters. The army, or a large portion of it, was stationed so far beyond civilization that it became a military necessity that soldiers should do the work referred to.

The stockade was finished, provisions landed and stored therein, and preparations made for an advance into the Everglades. More troops were on the way, and while awaiting their arrival a Seminole Indian approached the picket-line carrying a pole with a white piece of cloth tied to it. The officer in charge took him to the commanding officer, and through an interpreter it was ascertained that the Indian had been sent by his chief, Billy Bowlegs, with a message to the effect that he and his tribe desired peace.

This was communicated to the general in command (Twiggs) at Tampa, who sent word that he would meet the chief at our camp on a certain day. The general in due time arrived on the steamboat, and about the same time Billy Bowlegs came with a number of sub-chiefs and their squaws. The general invited them to a feast on the boat, where a powwow was held and a treaty agreed to; wherein the chief promised that the Seminoles would be good Indians for all time to come, and would go to the Western Territory at the stipulated time.

Uncle Sam then withdrew his warriors, leaving a small force to build what was afterwards known as Fort Myers.

Thus ended a bloodless campaign that restored peace to the settlers of Southern Florida for a few years longer.

D. ROBINSON,
Captain U.S.A. (retired).

A CONSCRIPT'S VIEW OF THE FRENCH ARMY.[1]

It has been the duty of the present writer, though brought up in England, to serve as a conscript in one of the Eastern corps of the French army. On coming out of this period, and looking back at the pictures which it presented, one is at a loss to find a regular series of ideas. As is the case with every life of routine and discipline, weeks of it sometimes pass without leaving more impression on the mind than would a single day, except the impression of dullness and an even influence. Then there will come scenes so striking and episodes so dramatic and intense that a whole lifetime of later experiences could never destroy their image. For though, of course, one of these great conscription armies cannot offer as much interest to the casual reader in times of peace as would the merest skirmish in active service, yet for the soldier it has about it much of the hardship, all the discipline, and, in the period of the manœuvres, not a little of the outward excitement of a war.

The first and most salient point in the French army seen from within is the mixture of social ranks. Now, this mixture, which might in many societies be a source of weakness, may be said here to be one of the principal causes of the recuperation of the country. It is, I believe, a unique experiment to lay the military law equally upon the shoulders of every citizen, of whatever rank he may be. The nearest approach to the French universal conscription is to be seen in Germany, but even there the absolute equality of men before the law is far from holding good. Promotion from the ranks is almost unknown; the rich, who can afford a university education for their sons and who can pay a sum of money to the government, exempt them from all serious soldiering. These young men pass a few weeks in barracks, and afterwards attend a specified time of drill, while they are allowed to lodge outside quarters and to follow their ordinary civil occupations in the university. This lasts, if I am not mistaken, for one year, after which term they pass into the Reserve as officers. But under the French law every man without exception serves in the army

[1] Reprinted from the *London Contemporary Review* by permission of the Leonard Scott Company, the American publishers of the *Contemporary*.

for at least one year. During that year he is merged entirely in the private soldier. His social rank, if he has one, is completely ignored; the officers who command him regard merely his efficiency and his faithfulness to duty, and if any difference is made between a man of some education and the peasants around him, it is in the direction of putting him into the *Peloton d'Instruction*,—a species of school of drill,—where he may earn in six months or a year the grade of corporal, but in which, on account of the extra duties the place involves, the life is harder in manual labor and has less free time than that of the unambitious trooper outside. It must not be inferred from this that the *Peloton d'Instruction* stands apart. It is held merely during the hours which are otherwise free time; nor must it be imagined for a moment that a man of a richer class than his fellows necessarily belongs to it, or that men of such a class form the majority of its members. There may be in a company or battery from six to eight *élèves caporaux*, and in a whole regiment less than that number of gentlemen. The elevation to the grade of Reserve officer is also proceeded with in a manner very different from that obtaining in Germany. The places in the Reserve are given in part to retired officers of the active army, and in part to those men who have followed the *Peloton d'Instruction* for at least one year, and who, at the end of that time, are competent to pass a special examination.

The result is peculiar, and on the whole is not prejudicial to the parties concerned. It may be doubted whether any other modern European nation could adopt such a system, but in France it secures all the obvious advantages which are attached to it, without the lack of cohesion and discipline which might follow in a less homogeneous nation. For there is in France a strange similarity between the various social ranks; differences are certainly very apparent to a Frenchman of the upper class, but they are extremely slight compared with those existing, for example, in England. The difference of accent which creates so profound a gulf between men in this country is hardly known in France; when it exists it may be referred to a local origin, like the Scotch accent or the Irish brogue, rather than to any difference in the social level. The development of the intelligence in different men is, again, only to a slight extent a question of class in France, and the small conventionalities of living which in other countries are confined to the richer part of the people penetrate very far down into French society. This similarity of classes has been characterized as superficial to a large extent, chiefly by those whose direct interests were attacked by it; but there can be no question that, once the necessity of conscription becomes apparent to a country, such homogeneity adds great strength to the military system.

Discipline loses somewhat in France by the absence of that class loyalty and deference on which German authorities have insisted so

much, but it gains in the possibility of raising to commission rank in large numbers men of long service and sound disciplinary qualities. And it would, I think, be the unanimous testimony of French soldiers that officers who have seen service in the ranks are the most constant in service, and the most sure of securing obedience, respect, and efficiency in their subordinates, a result which comes largely from their personal experience of the due limits of discipline, the transgression of which serves only vainly to exasperate the soldiers. The place and value of these officers raised from the ranks certainly comes from no lack of firmness or *poigne* on their part, and they are distinguished, as a rule, not for their over-great sympathy with the difficulties of a private's life, but for their experience of what is possible, and what impossible, in the duties to be demanded of a man.

This mixture of the different social ranks is remarkable also in the case of the private soldier. But here the military effect is less marked. Whether a man proves an efficient or inefficient soldier very much depends upon his physical strength and on his readiness to obey and to acquire the habits demanded of him. Physical strength is independent to a great extent of social differences, except that the peasant and the artisan have, in all that involves direct manual labor, the advantage over the product of the wretched public-school system which obtains in France. Readiness is insured by a discipline pressing so hardly and so equally upon all that the habit of continual labor is acquired with an ease and rapidity that surprise the man himself who is submitted to it. The great fatigues,—or rather the fatigues which seem so great after an ordinary civilian life,—the long marches in full kit, followed often by sleepless nights of guard-duty, seem at first unendurable. It is impossible to conceive, unless one has experienced it, how different is the hardship of such a life from that which a free man voluntarily imposes on himself; and when men say, on hearing of some forced march or feat of endurance, that they have on this or that occasion surpassed it, they leave out of reckoning the thousand difficulties that arise when large bodies of men have to do the same thing in concerted action, and with no regard for the individual. All these fatigues naturally press hardest on the man who has seen no active service to speak of, and on whom the *internat* has had its full effect. But it cannot be denied that the change, though it is sudden and extreme, has, as a rule, a good effect. The French *lycéen* learns in the regiment an independence and a self-reliance that years in the society of men of his own stamp could never teach him, and he picks up health visibly, in spite of the short hours of sleep, the bad food, and the perpetual labor.

A very large number of things which in this country are, I believe, put into the hands of civilian contractors, fall in France upon the shoulders of the army; and it is evident that in a position where a

little under two hours is allowed for mobilization the duties are far more rigorous than those of more sheltered places. The men who came to our frontier garrison, transferred from regiments lying farther inland, noted at once the increase of duties, and would tantalize us after the evening *soupe* round the barrack-room fire with descriptions of Orleans or Clermont Ferrand, where stable-guard came round every ten days, and cleaning harness after hours was unknown. But the difficulties entailed by the position give a certain pride to the men of the Sixth and Seventh Army Corps, and a man on leave is always careful to let you know that he comes from the gates of the country,—Toul, Epinal, or Belfort.

This excess of manual labor and lack of free time turn evidently upon the existence of the conscription. In a country such as England, where an army of voluntary enlistment is all that is considered necessary, these hardships supply their own corrective, for did the life of a private soldier become appreciably harder than that of a civilian the difficulties of recruitment would evidently increase. But this regard for the private in armies which cannot compel universal service is not an unmixed blessing. It has been questioned by many authorities in this country whether the usefulness of infantry, for example, would not be greatly increased if the marching in full kit were more of a habit than an exception. The infantry soldier of a foreign army, trained to immediate readiness and every fatigue, never mounts a guard, takes patrol duty, or makes the shortest march without the knapsack; and the first thing that strikes a foreigner, amidst all the splendid accuracy and smartness of English soldiers, is the frequent absence of that rather necessary part of the equipment.

Now, in a conscript army many of those regulations which fall hardly on the private soldier, but which are in the highest degree beneficial to the army as a whole, can be enforced, and the result is a necessary increase in the fatigue and irksomeness of a private soldier's daily work, of which he does not usually see the necessity.

It is, nevertheless, remarkable how little any spirit of discouragement or vexation exists in the ranks of the army, and how little the hardship which it has caused him to undergo affects the French elector when he leaves it to enter upon civilian life. The popularity of the army, the admission of its necessity, and the pride taken in its new vigor are sentiments in which the whole nation is practically unanimous. A candidate who seriously proposed any reduction in its numbers or its expenses would stand no chance of election in any French constituency.

This acquiescence in the necessity of a universal military service and in the justice of its object is at the present time the most salient feature in the political life in France; it is one which offers a striking contrast to the growth of socialism and cosmopolitan ideas among the

enemies of that country, and it is a striking witness to the tact and skill which the superior and general officers have exercised in building up a system so stable and a discipline so firm in a nation whose democracy tends every day to become more extreme; nor is it too much to say that it is perhaps these very political tendencies which, by laying the hard military service justly and evenly upon the shoulders of all, and by placing authority in the grade and not the person of a commander, have proved their best allies in the work they have completed.

It is not permissible in a member of such a body to point out its faults. But it can do no harm to enumerate those which foreign critics point out, especially those which most strike an Englishman. It is customary, in the first place, to note a certain lack of smartness and *tenue* in the French linesman which is particularly noticeable to a native of this country, accustomed as he is to the best dressed and the most perfectly drilled of any soldiers in the world. The physique of the French private soldier, again, is a subject on which some authorities in foreign countries are never tired of dilating; and there are some who will prove to you, by statistics of his height, weight, and chest measurement, that he is quite incapable of doing things as well as his neighbors, which as a matter of fact he does a good deal better. It cannot be denied that, as the soldiers of European armies go, he is short; and the prominence of this feature is increased by the fact that the armies to which he finds himself contrasted are invariably smaller than his own in proportion to the size of the population, the recruits that can be rejected in France on physical grounds without impairing the numerical superiority of the army being very few.

Other faults—numerous as they were, and evident in the disasters of twenty years ago—it is hardly necessary to mention. The breakdown of purpose which ruined many of the leaders, the lack of proper discipline in the earlier battles, and the fact that the French combatants in the later ones were mere hordes of recruits rapidly levied, without training or experience of arms, all point to the peculiar circumstances of a peculiar time. Neither infirmity of purpose, nor lack of discipline, nor armies unfamiliar with arms are characteristic of the French nation in history. These faults were, in the terrible campaign of 1870, the end of a disastrous *régime;* they were neither of long standing nor destined to endure, and it would be impossible in criticising the French army of to-day to draw any idea of its lasting defects from the momentary faults of that time.

But the objections first noticed and those that are most commonly brought against the efficiency of the French private soldier have all a certain measure of truth. It is undoubtedly true that his physique does not strike Englishmen as equal to their own; it is also true that the general smartness of the man is not up to the English standard.

How much of the ill effect depends upon the uniform may be tested by comparing a non-commissioned officer (whose pay in France is about the same as that of a private soldier in England) with a man in the rank and file, especially in a regiment whose colonel does not discountenance *fantaisie*. It is an eminently practical uniform, and one in which the apparel and military adjuncts have been reduced to a minimum, but it is one which leaves unnoticed a cleanliness and care that would be at once apparent in a smarter dress, and which takes away much of the motive for such strictness. But, with all this, it is true that the French linesman might be a good deal smarter in his personal appearance, and would not lose by another inch or two of height. And it remains only to mention in contrast the many peculiar and splendid qualities of a soldier which he does exhibit, and which are so apparent when one stands shoulder to shoulder with him in the routine of the barrack-room or the hard days of the manœuvres.

There is one quality in the French soldier which gives him a supreme value: it has by the writers of his own country been called endurance, but perhaps that word in English hardly gives the equivalent of what is meant; it is rather a power of recuperation and of extreme effort for a particular object which distinguishes him: it goes side by side with a peculiar gayety which shows him the lighter view of the darkest case. There is another quality which in days of short service and extremely rapid action is of no less importance: it is his intelligence.

The two combined more than compensate for those qualities in which the critics of other nations find him lacking. The conclusions, for example, at which a casual observer might arrive in regard to the marching power or rapidity of a French regiment, or the number of stragglers which it would leave on a forced march, or the minimum amount of food or sleep required by the men in any difficult circumstances, would as a rule be entirely erroneous. A type of man whom many would consider the least able to endure fatigue is, on the contrary, the most severely tried and the most heavily burdened of any soldier in the modern armies. It has, indeed, been a criticism passed by most military authorities in Europe that the French line has always carried into action a weight which seriously impaired its value. In 1870 this was certainly the case; and even nowadays, when everything in the accoutrement has been reduced to bare necessaries, the French private in full kit is expected to march, and succeeds in marching, with the weight upon him of everything that will make him independent of the *impedimenta* of the army. It has been the policy of the French military authorities at all times to give to their infantry a mobility superior to that of their opponents, and to effect this they have relied to the utmost upon the energy of the troops at their command. That this mobility will be of the highest utility, and that its

importance increases daily with the changes of method which have been introduced in warfare, cannot be denied; and it is a witness to the force of the material upon which the conscription draws that the strain has not proved too great under the hardest conditions of the manœuvres and experimental marches by which its effects are tested.

It has been remarked that the high level of intelligence which the conscript exhibits in France is of immense importance in the present state of the army. This factor increases in value as the system of conscription becomes more universal. In an army of voluntary enlistment, or in one whose numbers are small in comparison with those of the nation, the scale of pay will be high, and the average time of service long. There is no need to hurry in the forming of a recruit; his drill may last a full year, as it did in the French army of twenty years ago, and the time will not have been lost. Again, under such a system the regiment forms an excellent unit of training, especially in an army like that of this country, where the recruits arrive at all times in the year, and can be regularly drafted upon the completion of their instruction into the corps to which they belong. But as the conscription increases in severity the length of service must necessarily be shortened; as the recruits arrive in batches (which, in an extreme case, such as that of France at the present day, where the conscription is universal, form a third of the army), it becomes necessary to make the company or battery the unit of instruction; and even the six bare months which are all that remain for the training of the recruit are to be grudged out of the short period for which a man remains under arms. With these necessities the rapidity with which a recruit can receive instruction, and the general level which enables some thirty or forty men to be taught in unison, become of the most immediate value, and the army more than gains in efficiency what it may lose in the motives for obedience which exist where the differences of intelligence are more marked.

These qualities, which give the French soldier his superiority, are especially brought forward in the annual manœuvres. It has been the aim of the government for some years past—following, to a certain extent, the example of Germany—to throw a strong light, as it were, upon its military strength; and this can best be done by reproducing in a particular field all the main conditions of war. It is needless to touch upon the feeling caused by the greatest of these experiments in 1889; it was as though some new policy, introducing new factors into the conditions of Europe, had been laid before the surrounding nations. The English critics, who, under the circumstances, were the most impartial, gave reports which cannot fail to have impressed this view upon the military opinion of their country, and the period since that year has been one of continued success. The motives actuating that display were perfectly honest, and were, I think, admitted to be

such by all impartial observers. The experiment succeeded then, and has succeeded in every year since beyond expectation; but the result has never been made a motive for anything but increasing the work of defense, for it is a feeling which pervades the army quite as much as it does the nation that the period through which France has been passing is one of great difficulty, requiring the action of every silent energy on the part of every man.

Of the moral side of the conscription in France, how strongly it is supported by the peasant soldiers whom it produces, how solid is the patriotism of which it is the result, it has not been thought necessary to make much mention in this paper. Suffice it to repeat that personal service in the ranks, which more than any other experience is calculated to damp the enthusiasm of a man, and to make him, if he looks upon it selfishly, lose sight of great national ideals, has in no way impaired the strong love of country in the French peasant and workman, but has made it more sane, and has given it a clearer object. That the conscription in one nation has helped social order, while in another it has attacked it, is a matter depending largely upon the justice or injustice of its weight upon the people. In the France of to-day it is a matter of history that the private soldier when he returns to his civilian life strengthens the republic; and it is an experience of the present writer, in which he is sure that all those who have shared in the life of the French barrack-room will bear him out, that the value of his people and the peculiar strength of those qualities which lie at the root of their character, are never more apparent than in those long and hard months of ordeal which each man puts without question upon himself, and which, in the mass, have remade the nation.

HILAIRE BELLOC.

AMONG OUR CONTEMPORARIES.

In the March number of this magazine we referred to the occasional notices concerning camels which were supposed to exist in a wild state in our southwestern regions, presumably the survivors of those imported by the government for army use before the late Civil War. It has been generally asserted, by those who are supposed to know best, that wild camels do not exist, either in Asia or Africa, and that all such animals are owned by man, and, as it were, semi-domesticated. So fixed is this belief that "a lost camel" is a by-word in those countries for a helpless and forlorn person. In answer to our hope that some one familiar with Western Texas and Arizona might throw some light upon a subject which is extremely interesting from several points of view, Mr. Frank Wood writes to us from Boston, "In 1876 part of the herd alluded to were owned in Virginia City, Nevada, and were used to pack wood. My recollection is that their appearance so scared the horses that they were not allowed within the city limits."

Mr. Wood says they were afterwards sold, and that some time in 1877 he remembers seeing them in Bellville, Esmeralda County, and that they were, as he believes, on the way to Arizona. There were about a dozen of them, "some very large." "They camped overnight some distance from our own camp, as they were not allowed to come near, fearing that they would stampede our stock. At the time there were quite a number of Piute Indians camped near us, and they were no little alarmed" at the appearance of the camels. Mr. Wood says the herd left the next day, and he has never known what became of them.

Thus we trace some of these camels, no doubt derived from the imported lot of the days before the war, and we see that they were not "wild camels," but under the ownership of and working for man, just as in their native countries.

Surely there must be army officers who have knowledge upon the subject. May we not hope to receive some authentic information in regard to the matter of a more recent date than 1877?

The *Journal of the Military Service Institution* lately contained an excellent article by Lieutenant Swift, of the Ninth United States

Cavalry, upon the "Telegraph in War," the paper having been read before the Officers' Lyceum at Fort Robinson, Nebraska. He quotes General Grant in regard to the military telegraphers of our Civil War: "Nothing could be more complete than the organization and discipline of this body of brave and intelligent men." Also the words of General Sherman: "The value of the magnetic telegraph in war cannot be exaggerated, as was illustrated by the perfect concert of action between the armies in Virginia and Georgia in 1864. Hardly a day intervened when General Grant did not know the exact state of affairs with me, more than fifteen hundred miles off as the wires ran."

The description of military telegraphing by the author is clear and devoid of technicalities, but too long to quote. There are some paragraphs which we must extract, however, and these refer to matters which are only interesting and amusing now, but were of vital importance at the time they occurred. "There are other dangers to guard against. If the enemy's cavalry get possession of a telegraph-station, they can, if accompanied by an operator, easily send messages containing false information or delusive orders to well-known officers of the opposing army, while the place from which they are sent and the assumed name signed to them will give the messages an appearance of authenticity which, if it does not completely deceive the recipient, will at least be the cause of considerable doubt and perplexity to him, and perhaps cause him to hesitate to accept accurate information or authentic orders when actually received from proper sources. These dangers should be guarded against as far as practicable by efficient patrol of the telegraph-lines and by careful testing. 'Tapping' the wires by operators of both the Federal and Confederate armies was not unusual. Little information was gained, however, from the cipher dispatches, but it sometimes happened that important discoveries were made as to the whereabouts or intended movements, strength, etc., of the opposing forces. General Crook, while in command in the Shenandoah Valley, Virginia, during the war, sent his operator to tap the Confederate telegraph-wire near Shannon's Cross-Roads, and ascertain, if possible, what force was in his front. The wire was 'tapped,' but, owing to the peculiar style of handling the telegraph-key by the Federal operator, suspicion was aroused in the minds of the Confederate operators, and they declined to answer any questions. One of them, however, indiscreetly remarked that 'If that Yank don't hurry up and skip out, General Jenkins will get him.' This indicated that it was the Confederate General Jenkins's command, the very information desired by General Crook."

In his raid, in December, 1863, General Grierson sent his operator with an escort of two hundred troopers to tap the enemy's wires on the Mobile and Ohio Railroad. He intercepted most important and authentic telegrams, which were of the greatest value.

During Sherman's march to the sea his tapping seems not to have been so successful, for the enemy suspected him and tried to mislead him.

"Deception, however, is a part of the art of war, and most of the prominent officers on both sides profited by deceptions of this nature practiced by their telegraph operators.

"The most successful wire-tapping of the war was accomplished by one of General Lee's Confederate operators. General Lee was anxious to learn of the purposes of General Grant. The tapping of the Fort Monroe wire was suggested. A Confederate operator with a company of picked men were chosen for the hazardous undertaking. The United States military wire was struck near Surrey Court-House, Virginia. The operator attached his instrument to the main line by means of fine silk-covered wire. This he ran under the bark of the telegraph-pole to the ground, thence along the ground some distance in the woods, covering the wire with leaves. Thus was the Confederate commander placed in direct communication with the War Department in Washington. For six weeks this connection was maintained, and although many telegrams were intercepted and forwarded to General Lee, only one proved of value to the Confederates, owing to the efficient cipher system used by the Federal authorities. The one message, however, was of great benefit to the enemy. It was not in cipher, and was from the quartermaster in Washington, requesting that a guard be sent to meet two thousand four hundred head of cattle at Coggins's Point, and convoy them to City Point for the Union army. Accordingly, a strong force of Confederate cavalry was dispatched, and arrived at the designated place in time to intercept the cattle and convoy them to the *Confederate camp*.

"Wars, though less frequent, still occur, but the methods of conducting them are changed. If the ingenuity of man has provided weapons of offense and defense in superiority over the bow, the sling, and the shield, it has also produced means of conveying intelligence far more efficient and swifter than the runner, the voice, and the beacon."

A most excellent and interesting biographical sketch of Field-Marshal Count Wrangel appeared in the English *United Service* some little time ago, from the pen of Count A. Bothmer.

The son of Major-General von Wrangel, who died in 1805, Friedrich Heinrich Ernst, entered the Prussian army in 1798, with a commission as sub-lieutenant in Von Werther's dragoons, having then attained the ripe age, for a cavalry officer, of twelve and a half years. Needless to say, he thus participated in what was going on in the way of fighting foreign foes or internal enemies for a longer time than any other officer of all the armies of Europe, for he lived to be ninety-

three years old. In 1856 he had been a soldier for sixty years, and was made field-marshal. But at the age of eighty years he was in command in the war with Denmark about Schleswig-Holstein, and "bore the winter campaign like the youngest soldier." (Better, probably, we might interpose, for the youngest soldier is often the worst campaigner.) In 1866 he applied for a command in the Seven Weeks' War, but old Wilhelm refused, on the ground that his health was not good enough. Wrangel, determined to be in the campaign, joined the army as a volunteer. When the Franco-Prussian War broke out Wilhelm I. was in the same dilemma as to Wrangel, who was anxious to serve, and fully believed in his ability to do so. He was then eighty-six. Of course his application could not be entertained.

"Wrangel was a soldier of the old school, what in Germany is called an old Haudegen, a word which it would be difficult to translate, but which implies that he went at the enemy whenever and wherever he found him. It is probable that but for the great services he rendered Frederick William IV. during 1848 his career might have been a less successful one, for he was in no way a Moltke, and his methods were very simple. But if he was not a great strategist, he was, at any rate, a conscientious soldier, and became, more especially in later days, extremely popular. Anecdotes without number and well authenticated are told of him, and, as they serve to characterize the man, it may not be uninteresting to mention a few of them.

"Wrangel's education as a boy had, as has already been shown, not been a very good one. Accusatives and datives were a mystery to him; *mir* and *mich*, *Sie* and *Thuen*, *Dur* and *Dir* were always mixed up in hopeless confusion. It was his habit to speak to most persons, and notably to those younger than himself, in the second person singular, a familiarity usually only known in families and among friends. It gave him particular pleasure in his old age when the gentler sex took notice of him, and it was a weakness of his that he could not help paying loud compliments to any pretty girl that happened to pass him. But nobody seems to have taken offense at this little foible, and people only laughed when he wafted kisses up to the windows when passing through the streets of Berlin.

"There was a considerable amount of vanity in his character. He was fond of riding without stirrups, even when very old, and would appear in the most severe weather without a mantle, though rumor says that his uniforms were lined with plenty of cotton-wool.

"'Father' Wrangel, as he was generally called, invariably repaid the beauties of the towns which received him by kissing them. On one occasion he found several young ladies in white frocks standing in two rows. The first row the old gentleman thanked in the usual way by giving each a hearty kiss, but on coming to the second he paused, for here were those who had not quite such good looks to boast of.

"'Go on with the kissing, Eulenburg,' said Wrangel to his adjutant behind him.

"Such was Wrangel, who served four consecutive kings of Prussia."

We are reminded that we have had, among our distinguished men in this country, some who were much given to osculation when pretty girls were in question. General Sherman was a noted kisser, and so was Henry Clay, but both of them had an air with which they carried on the performance which rendered it a blessing instead of a caress. Nevertheless, we think both of them enjoyed it, and certainly, in General Sherman's case, the gallant old man had an eye for the prettiest girls.

Dr. Russell says, in his *Army and Navy Gazette*, "The Federal generals who came to the front in the great Civil War in North America are dying off rapidly. McDowell, Pope, Hancock, Sherman, Sheridan, McClellan, Grant, and many others have passed away. The Confederate leaders, Lee, Jackson, Johnston, preceded them, and now Beauregard, once regarded as the great leader of the South in the field, has gone to join his brethren-in-arms. When Fort Sumter was in ruins under the fire of the Charleston batteries erected by the young engineer, in the exultation of the moment the name of the modest but very resolute brigadier who had just 'seceded' from the United States army was on every tongue. In the words of a song popular at the time, 'the South saluted the North with their Beau regard.' . . . When the war assumed dimensions which taxed the abilities of the best officers on both sides to handle the vast masses of men under arms, the fame and estimation of Beauregard waned before the genius of Lee, but he still held high place in the councils of the Confederates, and vindicated his claim to their confidence in the masterly defense of Charleston and in the humiliation of the hated Ben Butler, whose death happened a few weeks ago."

Here is a fact in which the editor of the journal is entirely at sea. No matter what were Butler's merits or demerits,—and he had some on both sides,—he never was in command of any attack on Charleston, nor was he ever in the vicinity of Charleston, so far as our memory serves, after the time, "befo' de war," when the Democratic Convention met there, and he (Butler) supported the nomination of Mr. Jefferson Davis for the Presidency of the United States.

These things are "ancient history" now, according to the slang of the day, but let us set them right while some of us are left to do it.

The editorial goes on to say that Beauregard was calm, rather reserved, and by no means exuberant in humor or gayety, and not very French in disposition. The calmness and reserve attributed to him will not be borne out by his frenzied proclamations and orders in the

early part of the war, especially before hard knocks had brought him to his bearings.

An excellent officer, a skilled engineer, a brave man, we do not wish to detract from his merits a particle. But surely the description given of him in the editorial referred to will not be borne out by those who knew him best, even in this era, when the hatchet is buried forever.

The Creoles did swear by him, first and last. There is the story of two New Orleans Creoles who were in a railroad train, and talking of the war. A Virginian, who was sitting near, said, after an hour or two of accounts of Beauregard's achievements, "Gentlemen, you don't seem to have heard much of Lee."

"Li? Li? Who is Li?"

"Oh, Alphonse," said his friend, "didn't you hear of General Li? Beauregard tink werry 'ighly of Li."

Anent the Panama exposure and scandal, the Paris correspondent of the Philadelphia *Evening Telegraph* has these pertinent remarks:

"Yet, after all, the reactionists who are making such capital out of the Panama affair have not much to boast about. Commercialism, with its corrupting influences, had not developed to its present extent, when monarchs and emperors reigned over the destinies of the French people, yet there was no lack of dishonesty very freely displayed by high government officials. If an ex-Minister of the republic has been bribed, if some Republican members of Parliament have sold their votes, what is this to the acts of brigandage committed in the name of king or emperor? After all, the campaigns of Bonaparte in Italy are not forgotten, nor the depredations of Soult in Spain. With the names of Talleyrand and Cambaceres are associated the record of thefts committed in army and other government contracts. And under King Louis Philippe there was the Gisquet gun scandal, a loss of ten millions of dollars to the state. Were not two Ministers, members of the Royalist government, Teste and General Despars, condemned for corrupt practices? And were not thefts committed by the secretary of M. Guizot, the Royalist Prime Minister?

"Under the monarchy, as well as by M. Grévy's son-in-law, decorations have been sold, and the concession for the Lyric Theatre was a barefaced government bribe. As for Napoleon III., his very reign was based on perjury, fraud, and violence. How about the twenty millions of dollars that General Saint-Arnaud took from Napoleon's desk? Then do not let us forget all the jobbery attending the Haussmannization of Paris, for which the Parisian is still overburdened with taxation. Let any one read Zola's great novel "La Curée" for further light on this shape of governmental dishonesty. And what shall we

say of the Mexican expedition,—was that an honorable undertaking? And the whole government was concerned, not one or two corrupt individuals, in that venture. The Panama scandal is a scandal, a great and lasting disgrace, but it is not for Royalists or Imperialists to throw stones at the republic. It would be too easy to throw the stones back and break the glass walls of the houses in which they live.

The prize-fighting fraternity seem to have come to us,—not to stay, let us hope, for they are very poor material for building up a country. We must suppose that they are brave, in the sense that a bull-dog is brave, but they are not desirable citizens when they become very numerous, as they are now.

The writer was in former days shipmate with a man who had been quite a celebrated prize-fighter, and who had, we afterwards learned, shipped in the navy to avoid the consequences of an indictment for manslaughter. Physically a good specimen of a man, he was readily taken as a landsman, and, almost as a matter of course, put in the "after-guard," where he holy-stoned and wielded a big swab, and "swept down" with great care when that performance went on, as it did half a dozen times a day, as the boatswain's-mate of the watch piped "sweepers."

As the cruise went on this man was just the same, although many landsmen were promoted for their adaptability to the sea-service. One night and day we had one of those gales which try men's souls, and bodies too, and on a midnight muster of the watch coming on deck this "waister" was found wanting. Had he gone overboard? Where could this big fellow be, when we wanted his beef at the braces to wear ship? At this juncture the boom-cover was thrown back to find some piece of gear stowed in the launch, and here was discovered our pugilistic champion in a "blue funk," absolutely sweating and quaking, and asking whether the ship was going down. Now, this fellow was brave enough, in a certain way, to stand up and be hammered, and to hammer an adversary so that he died of his injuries, yet when placed face to face with real danger, where safety depended upon every man's doing his part, he was a perfect cur.

A leading New York paper lately remarked, "According to the adjudication of the Orphans' Court of Philadelphia on Tuesday, the estate of the late Samuel J. Randall amounted to seven hundred and eighty-nine dollars and seventy-four cents, not enough to pay the bills of the physicians who attended him during his last illness.

"Of this amount five hundred and eighty-nine dollars and seventy-

four cents was due by the government for salary, leaving the total value of his property two hundred dollars at the time of his death.

"Mr. Randall had spent about thirty years in the service of the public, and during the greater part of that time filled positions of great responsibility. There were many occasions when he could have gained a fortune by his mere silence. But he was innately and aggressively honest, and jobbers and lobbyists and all the corrupt crew of bribe-givers and bribe-takers instinctively knew it. He lived in an atmosphere above suspicion. No one dared approach him with a questionable proposition. He remained incorruptible during the most corrupt period of the nation's history. The only heritage he left his family, after the long and exacting labors of his public life, were an honest name and the memory of his devotion.

"This fact does more honor to him than many monuments could, and suggests some sharp and striking contrasts.

"An American Congress should see that such an example is not lost on American youth. It is worth volumes of hypocritical homilies and whole church-yards filled with lying epitaphs."

Every word true! The writer knew Mr. Randall from the time when we were boys. Representing, as he did for so many years, one of the very "toughest" of districts, it is wonderful how no one ever approached him with any schemes which had a flavor of rascality. They had to work them out in some other way, and keep such matters out of his sight.

As Speaker of the House—certainly the second place in power under our system of government—his decisions were so thoroughly in accordance with parliamentary law, and so fair and honest and so well adhered to, that few chose to raise a question in regard to them.

Some months ago the *Army and Navy Gazette* had a short editorial, which we reproduce, not having space at the time it appeared:

"Vice-Admiral Cavelier de Cuverville, one of the most patriotic and worthy of French seamen, has contributed to the *Revue Maritime et Coloniale* an article which, though, as he says, lying a little outside of his *spécialité*, is nevertheless well worth noting here. It is a plea for French immigration into Canada. He gives a glowing picture of the expansion of the French race on the American continent, which Frenchmen at home will read with mixed feelings, describing how French Canadians have overflowed in large numbers into Maine, New Hampshire, Vermont, and even the State of New York. We need scarcely say that the admiral does not wish to see the French race merged in the Anglo-Saxon. He quotes, indeed, Lord Dufferin's speech before the Legislative Assembly at Quebec (1878), in which the then governor-general remarked that the combined action of the

divers national elements of Canada gave to its life a freshness, a variety, a color, and an electric impulse which would be wanting without it. In short, the admiral proclaims that the growth of the French race in Canada is favorable to larger relations, commercial and other, and that France may 'conquer Canada' by the peaceful extension of her influence, and by promoting intelligent and 'grouped' immigration into the country. If the population of France stands still at home, thus it may, he says, grow abroad, and to remain stationary is to fall behind. He suggests the establishment of a proper body to favor these larger relations, as well as the running of regular passenger and cargo steamers, not swift liners, to carry passengers between Havre and Montreal, or, in the summer, between Havre and Halifax or Portland. Well! They will be Canadians, these immigrants,—in a generation, we hope,—with all the loyal instincts of the people of the Dominion. Assuredly they will not be republicans."

What, exactly, the *Army and Navy Gazette* is driving at, in the last few words, we cannot clearly make out. Is it that the descendants of the French in Canada will become attached to English rule, as distinguished from that of the neighboring republic? Hardly so; for, if all testimony is to be taken, they are almost as much opposed to it in their hearts as they were at the end of the Seven Years' War.

Then, again, within a generation or so the "habitans" have broken their ties and left their little subdivided *arpents*, to come over, as the editor says, to the States. They do not go back, but, on the contrary, Anglicize their names. Why?

Even the "assisted emigrants," who are sent over from Great Britain to Manitoba and the other places described with such glowing language in circulars, are apt, after a little experience, to follow the example of old Uncle Ned, and "lay down de shovel an' de hoe," and make a short track for the States across the border. Again we ask, why? These are facts beyond all contravention. The tendency of the settlers in Canada is to come to us. We don't object to them. If they come to us they *must* be republicans, in *our* sense of the word. But as to the country itself coming, that is another question. They would have to ask it, and then would occur the consideration about their great debt and many other questions. All the Frenchmen who come under Vice-Admiral de Cuverville's proposition will not greatly alter the condition of affairs. In fact, the Frenchman of to-day would probably not stay in Canada, even if he did come there in the first place.

The officers of the "Victoria and Albert," the queen's yacht, have always had a very nice billet, according to the views of some people. Others would think that it was a complete burial of any real professional benefit and advancement to serve in such a position. It would

seem—at least to the uninstructed—an impossibility for an officer with an ambition to succeed in mastering his profession to remain long in such a post. The rust must come upon him as surely as promotion (in this case) does.

An English contemporary said recently, "'Victoria and Albert;' Rear-Admiral J. R. T. Fullerton, A.D.C., who still holds the command, was appointed in 1884, and Fleet-Surgeon Woods in 1887."

The command of a paddle-steamer which is only used once or twice a year to take Her Majesty to and from Cherbourg seems a strange position for a rear-admiral. A Channel pilot would do as well, except for the name of the thing, as the discipline of the royal yacht must be an exceedingly easy matter. If a man misbehaves he might be sent elsewhere or discharged. In either case he loses the flesh-pots.

Seeing this state of things, the "growlers" of our naval service, who object to certain officers holding certain positions so long, may find some consolation in the fact that it occurs elsewhere. Moreover, all history teaches that such things have always occurred, in all states and services, and the corollary is that they always will occur, *in sæcula sæculorum.*

Serious attention is being paid in Germany to plans for perfecting a light coat of mail, impenetrable to rifle-bullets or to the bayonet. The one we mentioned recently, invented by Herr Dowe, a tailor, of Mannheim, has, it is asserted, already been provisionally purchased by a syndicate for one hundred and fifty thousand pounds, but it is only one of three. Another was made two years ago by an Austrian engineer named Sarneo, who tried in vain to induce his government to take it up, while a third has been submitted to the German Military Department by an engineer of Mannheim, named Reidel. It is said that the latter can make an impenetrable shirt covering the frame down to the knee, and capable of adhering to uniform cloth, which weighs only five pounds. All are believed to be made of compressed hemp, faced with rings of thin wire, and all are completely bullet-proof at a hundred yards, though all, of course, allow the bullet to inflict a terrible bruise.

Many persons will remember the breastplates which were so extensively advertised in our Eastern cities during the first year or two of the Civil War. They were thin plates of steel, forming a cuirass, concealed between the cloth and lining of an ordinary waistcoat. Whether they would turn a missile or not was uncertain, but possibly they would, under certain conditions. It was at a time when the friends of the volunteer supplied him, in addition to "bullet-proof waistcoats," with revolvers and bowie-knives, to be carried in addition to the load of an infantry soldier. Of course, one campaign put an end to all foolishness of that kind, when, in marching through mud or dust,

blanket, knapsack, haversack, canteen, musket, and "forty rounds" were found sufficient burden, without any fancy additions.

In regard to the German invention, nothing is said by its promoters as to what would happen if some of the compressed hemp and wire rings should happen to be driven into the chest by a missile which *did* penetrate.

There are several changes of equipment for the German army, either effected or in contemplation. It is probable that the helmet will be retained, but, in consideration of the new conditions which must exist in actual warfare from the use of smokeless powder, the head-piece will have some cover which will prevent any metallic reflection. The tins and utensils carried on campaigning service will be given a dull color, for the same reason. The load which the infantry soldier at present has to carry is to be lightened, if possible, and experiments looking to that result are in successful progress.

For the Landwehr the tunic has already been replaced by a more convenient and comfortable garment, called *litewka*.

In addition, the difficulties which existed in the employment of aluminum for mess utensils and other such purposes have been overcome, it is said. This would make a very sensible difference in the load of the soldier, as well as of the baggage-wagons. It appears that it has been decided to let the uniform of the cavalry alone, as their showy uniforms will be kept in the rear until wanted, and then, when in action, be concealed by clouds of dust. How about a rainy or snowy day, when there is no dust? Of all soldiers, it seems that horse-soldiers—unless they are purely for ornamental purposes—should have uniforms and horses that should not attract the attention of batteries while making an evolution.

The holding of Tonquin as a dependency is extremely unpopular in France, as the future benefit to French commerce seems incommensurate with the loss of life from the nature of the climate and the terrible nature of the guerrilla warfare eternally waged there, while the expense of the occupation must be very great.

The *Figaro* publishes a list of casualties in the military force during the year 1892, which tells the story in a very few words. During the twelve months nineteen officers have been killed and nine wounded, while the killed and wounded among the rank and file numbered five hundred and eighty-one. The casualties were spread throughout the year, which illustrates the nature of the hostilities. The marine infantry and artillery have been the greatest sufferers, as is natural, for those troops bear the brunt of the French colonial military service.

Meantime, the Dutch seem to have a hard nut to crack in their attempted occupancy of Northern Sumatra, but they do not furnish particulars of losses to the newspapers; and the number of men yearly lost by them, from small fights and from disease, is a matter of conjecture for the outside world, but it must be very considerable. The Dutch have lately established a coaling-station at Pulo Way, an island at the northern extremity of Sumatra, and built a fort there, a proceeding which has created quite a flutter among the English traders and officials in the East, as it is "in the very middle of the ocean highway leading from the West to the far East sighted by every steamer on that track passing in and out of the Indian Ocean, having the wealth of Sumatra at its back, and by no means deficient in harbor accommodation." It seems to present a most favorable spot for a new commercial centre, in which case it must surely affect the prosperity of Singapore, its neighbor.

The Manchester *Guardian* pays this great compliment to the American government: "It is remarkable to consider how slow the American government was in coming to the decision that a strong navy is a national necessity. While the nations of Europe and even two or three of the South American republics were spending their millions in the construction of ironclads and cruisers of the modern type, the Americans were for a time content to look on and do nothing. It would be a mistake, however, to suppose that they were uninterested observers. The fact appears to be that they were profoundly interested in what was going on. While Europe was every year spending millions of money in experimenting in ships and guns, they kept their dollars in their treasury and obtained at a cost of little or nothing to themselves the knowledge which was being secured at so heavy a sacrifice by the rival powers of the Old World. And now, with the accumulated experience of Europe at their disposal, they have struck in, and, with characteristic energy, have within a very brief period created a really strong fleet. The English navy, of course, stands at the head of the navies of the world. America takes rank as fifth in the list, a position with which she is not likely to remain satisfied, now that she has in grim earnestness put her hand to the work."

The leading daily papers have lately bestowed a good deal of space upon the subject of our representatives abroad, particularly as to the newly-created rank of ambassador, who represent abroad our wealth, power, and dignity as a nation. To be shabbily represented is worse than to have no representation at all; and one of these journals remarks, with justice, "It will no doubt be contended that it will not be,

if our ambassadors and ministers are men of such distinguished character and ability as to be wholly worthy of the great office the duties of which they are chosen to discharge. The nation has not lacked—does not and will not lack—such representatives, and, being of such approved worth, the least the government can do is to give them such fair or liberal compensation as befits their worth. In our social or business world men are compensated according to their respective abilities. For the lower place the lesser reward; for the higher one the greater reward. In some degree this custom is observed in the diplomatic service, but in the cases of our ambassadors and ministers not one is compensated for his services according to either the importance of the post he holds or the dignity of the nation."

This is temperately put, especially when we consider that some of our ministers have sacrificed their private fortunes in efforts to maintain the prestige of their country abroad, while others of distinguished ability, but less favored in regard to this world's goods, have been obliged to forego such distinction altogether.

In commenting upon the subject the New York *Sun* says, "We cannot insist too strongly or too often upon the fact that a shabbily-equipped American embassy in London, Paris, or Berlin will bring ridicule upon this nation. Whatever abstract theories may be propounded as to the simplicity of social democracy and the dignity of unadorned American manhood, it is nevertheless true that these theories will not pay the bills of our new ambassadors while representing the United States in the most expensive capitals of Europe."

And now in regard to our consular service. The late Captain Henry A. Wise, of the navy, in one of his droll yarns—perhaps in "Los Gringos"—says that in every properly-constituted wardroom mess there is at least one member who stands ready to "lick" the American consul, whatever the port may chance to be, for sins either of omission or commission.

Of course, this is only Wise's fun, but under it lies a foundation of truth. There are, and always have been, numbers of good, worthy, and efficient gentlemen in the employ of the government as consuls, but very many, unfortunately, are taken from a class indifferently fitted for such a post, being often persons without experience, and appointed by the influence of friends, either because they can find no other post, have bad health, or wish to enjoy a holiday and residence abroad at the public expense. With such persons the duties of the office are a bore, to be delegated to a clerk, or dispatched in as short a time as possible, the incumbents knowing that political friends will keep them in for four years, and after that—the deluge. Unfamiliar with foreign languages and business customs, tastes, and requirements, they, the business agents of the government, assume the airs of diplomats, become stumbling-blocks in the path of business, and, not un-

frequently, objects of ridicule to the people among whom they are sent to reside.

Of course, this is not meant to be a sweeping assertion, but those who know best will bear out the statement that such cases are not infrequent. One of the leading journals of the country lately remarked, in the course of an article upon this subject,—

"What would be thought of the practical ability of a manufacturer who made a practice of removing periodically all his foremen and heads of departments, and filling their places with raw and inexperienced men? His folly would not be greater than the ignorance and stupidity displayed in the direction of the American consular service. The utility of non-partisanship in the management of government navy-yards and machine-shops is now generally conceded. If Secretary Herbert were to discharge all the experienced foremen and the best mechanics in the Brooklyn Navy-Yard in order to fill their places with political heelers, he would not have a defender in the country. That is because every one perceives that good mechanics rather than active politicians are needed for the construction of a new navy. But is there any rational explanation for the preposterous system of discharging faithful and competent members of the consular service, and rewarding two hundred or more politicians by sending them abroad for work for which they have no special aptitude or qualifications?

"The time is surely coming when the consular service will be conducted entirely upon a non-partisan basis. The commercial interests of the country imperatively require the abandonment of the present irrational method of dealing with consulships as so many loaves and fishes to be divided among needy or ambitious political hacks. The service ought to be raised to the dignity of a profession, which young men can enter, and after working out their apprenticeship, rise from grade to grade by an orderly system of promotions. Removals for any cause except misconduct ought to be impracticable, and an increased salary list can judiciously be employed for attracting a superior class of consuls. At present, as the Providence *Journal* sententiously remarks, 'We bid for government representatives of an inferior grade, and we get them.'"

In other words, make consular service a career, respectably paid and with reasonable prospect of promotion. The benefit to our business and personal interests abroad would be immense, the increased volume of trade balancing any increase of expense for salaries.

On this year's anniversary of the battle of Cerro Gordo an interesting event took place in the hall of the Historical Society of Pennsylvania, being the presentation to the Society of the colors of the two Pennsylvania regiments which served in the Mexican War.

When the call for troops was made these two regiments were promptly raised and as promptly dispatched to the seat of war, but, strange to say, they were allowed to leave the State without any colors whatever, the matter being apparently overlooked by those in authority. While upon the passage from New Orleans to Sacrificios, Captain Small managed, with the bunting he found on board ship, to make a rough flag, with an attempt at the coat of arms of Pennsylvania in the blue field. This flag was carried through all the battles from Vera Cruz to the final entrance of the little army into the City of Mexico.

The conduct of these regiments had been most gallant, not only in the battles, but during the siege of Puebla, where five companies formed part of the defenders during the thirty days that they resisted twenty times their numbers so successfully that at the end of that time the siege was raised.

Noticing the lack of colors in two of his favorite regiments, General Scott, after possession of the City of Mexico was assured, caused two handsome flags to be embroidered, with the coat of arms of the United States upon a field of heavy blue silk, and with the names of the regiments, and these he formally presented with his own hand at a special parade. After the war was over the officers and soldiers of the Pennsylvania troops who had safely returned formed a society, which was named the "Scott Legion," prominent in the councils of which were Generals Robert Patterson and George Cadwalader, and to the care of this Legion were committed the two Scott flags, as well as the rude colors under which they had fought so well. The number of the society has now by lapse of time become very small, and the survivors decided upon placing their treasured colors in safe hands before they, too, answer the last roll-call. No better place could be found than in the spacious halls of the Pennsylvania Historical Society, a portion of which constituted the former residence of General Patterson, and where during his life so many of the officers of General Scott's army annually dined, in commemoration of Cerro Gordo, Chapultepec, and Molino del Rey. The two silk flags have suffered from the tooth of time, but have been skillfully restored and placed in a large and handsome glass case. Over them hangs the quaint old bunting flag, with the State arms, somewhat the worse for what it has passed through, but still promising to last in its honorable retirement for many years to come.

E. SHIPPEN.

NAVAL AND MILITARY NOTES.

NOTES AND DATA ON NAVAL AND MILITARY MATÉRIEL AND ALLIED SUBJECTS.

It is the intention to collect and publish in this department of the "United Service" all information obtainable from current publications and other available sources concerning ships, guns, armor, explosives, small-arms, military and maritime affairs, and kindred subjects. As the data are derived largely from unofficial sources, strict accuracy cannot be expected; but all reports will be carefully examined and compared with others on the same subject, and it is hoped, by this means, to attain fairly correct results. Erratum notices will be published whenever errors are discovered in data previously given. As the development of the present plans for collecting information progresses, it is hoped to secure fuller and more authentic reports.

WAR-SHIPS AND TORPEDO-BOATS.

Great Britain.

Nothing definite has yet been given out in regard to the protected cruisers *Powerful* and *Terrible*. It is said that the length will exceed 500 feet, and the beam will be about 70 feet; engines of 30,000 I. H. P. will be fitted, calculated to give a speed of 25 knots on the measured mile. The First Lord of the Admiralty stated in Parliament that these vessels would in speed, armament, protection, and coal-supply exceed all cruisers afloat. If this ambitious programme is carried out they will be remarkable vessels, but—well, we will wait and see.

The gun-vessels *Alert* and *Torch* are to be built at Sheerness. These vessels are of steel, sheathed with wood, and coppered for service on foreign stations. The *Alert* is already under construction, and the *Torch* will be taken in hand shortly. The dimensions are, length, 180 feet; beam, 32 feet 6 inches; draught, 11 feet 6 inches; displacement, 960 tons. The engines are twin-screw, triple-expansion, and are expected to develop 1050 I. H. P. with natural draft, and 1400 I. H. P. with forced draft, the corresponding speeds being 12.25 and 13.25 knots. The battery will consist of six 25-pounder and four 3-pounder R. F. G. The coal-supply is 130 tons.

The *Charybdis* (4360 tons), a sister ship in all respects to the *Cambrian* described in the May NOTES, was launched at Sheerness June 15. The battery of these vessels, omitted by mistake in the description of the *Cambrian* above referred to, is as follows: Two 6-inch R. F. G., one forward and one aft on the upper deck; eight 4.7-inch R. F. G. on the upper deck in broadside, inclosed by a light bulwark or superstructure; eight 6-pounder R. F. G., one 3-pounder R. F. G., four machine-guns, and one light field-piece.

The torpedo-gunboat *Speedy*, the largest craft ever built by Thorneycroft, was launched at the works May 18. The *Speedy* is a sister ship to the *Jason*, described in the May NOTES, in all respects except the boilers and a few unimportant details. The boilers are of the Thorneycroft tubulous type, designed for a pressure of 210 pounds. The *Speedy* has three funnels and two pole-masts. The raised forecastle extends from the

stem for about one-third the length. From this point the upper deck, surrounded by light bulwarks, is uncovered. A flying-bridge extends to a point about 60 feet from the stern, where the bulwarks end. The boilers are 8 in number, 4 in each fire-room; the heating-surface is 1840 feet, grate-surface 25.5 feet, diameter of tubes 1½ to 1¼ inches. The anticipated I. H. P. is 4500, one thousand more than in the others of this class.

The machinery of the *Kingfisher* has been removed, and, renamed the *Lark*, she has been turned into a sailing training-ship.

Of the torpedo-boat destroyers referred to in the May NOTES (page 487), six have been given out by contract,—the *Daring* and *Decoy* to Thorneycroft, the *Ferret* and *Lynx* to Laird of Birkenhead, and the *Havock* and *Hornet* to Yarrow. Brassey gives the length and beam of the first two as 180 feet and 19 feet, and of the last two as 180 feet and 18 feet 6 inches. No other details have been published. The contract price averages about £34,300. If these prove successful the following will be constructed: *Ardent*, *Boxer*, *Bruiser*, *Charger*, *Dasher*, *Hasty*, *Janus*, *Lightning*, *Porcupine*, *Rocket*, *Shark*, *Surly*, *Teazer*, and *Wizard*.

The natural-draft (an air-pressure of 0.22 of an inch was used) trial of the *Ramillies* took place April 25, and the results were given in the July NOTES. The forced-draft trial took place on April 27, with the following results: Mean revolutions, 102.55; steam in boilers, 150.5; mean I. H. P., 11,549; mean speed by patent log, 17.25 knots; mean air-pressure used, 0.35 of an inch. The trial lasted four hours. For one hour, with 0.63-inch air-pressure, the I. H. P. was 12,080. The mean draught of the ship during the trial was about 25 feet, or nearly 2 feet 6 inches less than the designed mean load-draught. As she displaces about seventy-five tons per inch at load-draught, the displacement on trial was 2250 tons short, or about 11,900 tons instead of 14,150. The speed attained is therefore no guide to probable performance in service. [See remarks upon the trial of the *Repulse* in the July NOTES.] The coal consumed per I. H. P. per hour is stated to have been 2.17 pounds, but no dependence can be placed upon data of coal-consumption derived in this way. The duration of the trial was insufficient, and the conditions of British trials are too irregular to make the reports of any practical value as a basis for calculations.

The trials of the *Empress of India* took place under similar conditions to those which obtained with the *Ramillies's* trial given above. The draught on trial was 25 feet 6 inches, and displacement about 12,350 tons. The natural-draft trial took place on May 4, with the following results: Steam in boilers, 148.5 pounds; vacuum, 29 inches; mean revolutions, 96; mean I. H. P., 9507. The duration of the trial was 7 hours, and the air-pressure used was 0.5 of an inch. The forced-draft trial was made on May 13. The results were, steam in boilers, 150.8 pounds; mean revolution, 102; mean I. H. P., 11,625; mean speed by patent log, 18 knots. The air-pressure in the fire-rooms was 1 inch; duration of trial, 4 hours.

The *Gibraltar*, 7700 tons, was to have been tried on May 11, but owing to the discovery of some defect it was postponed. On May 23 she began her trial with natural draft, but at the end of four hours her boilers were priming so badly that it was necessary to stop the trial.

The first-class protected cruiser *Endymion*, 7350 tons, of similar dimensions to the *Gibraltar*, but unsheathed, was tried early in May. Only one of this class, the *Grafton*, is intended to be pressed with forced draft. The machinery of the others has been arranged to develop a maximum of 10,000 I. H. P., instead of 12,000 as originally proposed. At the trial the mean draught of the vessel was 20 feet 7 inches, or 3 feet 2 inches less than her mean load immersion. The mean results were, steam at boilers, 152 pounds; revolutions, 99.5; I. H. P., 10,646; vacuum, 27 inches; air-pressure in fire-rooms, 0.17 of an inch; speed by

patent log, 20.9 knots. The *Hawke*, a sister ship of the *Endymion*, went into commission with a crew of 584 officers and men, and presumably the complement of the *Endymion* will be the same.

The first-class protected cruiser *Crescent*, of 7700 tons, built of steel, sheathed with wood and coppered, is a sister ship of the *Gibraltar*. Her eight-hour natural-draft trial took place May 19, with the following results: Steam in boilers, 152 pounds; vacuum, 26.6 inches; I. H. P., 10,370; speed by patent log, 18.6 knots. The trial took place without assisted draft, the fire-rooms being open during the entire run. No reports of the draught of the ship were published, but she was probably nearly at load displacement, judging from a comparison of speeds. The *Crescent* has been fitted with torpedo defense nets and booms, arranged on the German system, the nets lying on iron gratings outside the ship and the booms secured up and down instead of diagonally. The *Ramillies*, *Endymion*, and *Gibraltar* are being fitted in the same manner.

No detailed reports of the first forced-draft trial of the torpedo-gunboat *Niger* were published. It now appears that she failed to reach the 3500 I. H. P. required by contract, and another trial was made on May 20. It is said to have been successful in all respects. The results were, steam in boilers, 148.3; revolutions, 255.9; I. H. P., 3773; mean speed by patent log, 19.3 knots. The duration of the trial was three hours.

The torpedo-gunboat *Alarm*, 810 tons, a sister ship to the *Niger*, had her eight-hour natural-draft trial on May 1. The results were, I. H. P., 2593; revolutions, 223; speed by patent log, 18 knots; air-pressure, 0 8 of an inch. The results of the three-hour forced-draft trial, which took place on May 3, were, steam at boilers, 148 pounds; revolutions, 262.5; I. H. P., 3884; vacuum, 27.5 inches; speed by patent log, 19.6 knots; air-pressure, 2.17 inches. The trial was considered very successful in all respects. No signs of leakage were discovered in the boilers, and the engines worked smoothly and gave no trouble.

The torpedo-gunboat *Seagull* has had a new trial to test the efficacy of the copper sleeves, of the same diameter as the tubes themselves, which had been fitted over the furnace ends of the boiler-tubes. Her boilers were originally like those of the *Barham*, and had an insufficient, in fact almost no combustion-chamber. They were designed to develop 4500 I. H. P., but this was clearly beyond their power, and it was doubted if they would even give 3500. One-half of her boilers only were refitted as above, and the orders were to develop 1700 I. H. P. The attempt was successful, but the air-pressure was 4.1 inches. The results were, steam at boilers, 113 pounds; vacuum, 29 inches; revolutions, 205.5; I. H. P., 1731. The trial was considered satisfactory, and it is hoped that this arrangement will not be open to the defects of the ferrules, which require frequent renewing, and render the process of sweeping the tubes a matter of considerable difficulty.

The torpedo-gunboat *Spanker*, 735 tons, a sister ship to the above, was recently taken out for a 24-hour run at three-fifths power. The trial was brought to an end after 22½ hours by the breaking down of the controlling gear of the steering-engine. The results obtained were, steam, 115 pounds; vacuum, 26.7 inches; revolutions, 163.5; I. H. P., 1158; air-pressure, 0.66 inch; speed by patent log, 11.3 knots. The low speed was said to be due to a very foul bottom, as the vessel had not been docked for a year. But aside from this the results of the trial, as reported, are peculiar. The total power developed is far from three-fifths of 3500 I. H. P., which the machinery is supposed to be capable of reaching, and farther still from the 4500 I. H. P. for which it was originally designed. And yet the air-pressure was not particularly low. The lack of correspondence between the revolutions and the power developed in the engines is, however, the most astonishing feature. The former are given as 163.3 and 163.7 and the latter 546 and 612 I. H. P. for each engine respectively,—a most inexplicable state of affairs.

The belted cruiser *Galatea*, 5600 tons, on her recent trial, May 12, after recommissioning, attained the following results: Steam, 129.7 pounds; revolutions, 98.5; I. H. P., 6305; speed on the measured mile, 16.9 knots. The air-pressure was 0.2 of an inch. The trial was arrested before completion by the rush of water through the hawse-pipes.

The *Barham*, whose full-power trial was described in the July NOTES, was given a commission trial before starting for the Mediterranean in May. The results were, steam, 136 pounds; revolutions, 174; air-pressure, 1.15 inches; I. H. P. 8311; speed by patent log, 16.2 knots.

France.

The French naval programme, if not modified by the budget committee or by parliamentary vote, will provide for the commencement of work on the following ships: Three squadron battle-ships, a first-class cruiser of the *D'Entrecasteaux* type (cruiser O, one of the two described in the July NOTES and originally in the programme for 1893, but whose construction has been delayed), five second-class cruisers, one of the third class, a number of torpedo-boats, and the torpedo-transport *Foudre*. Two of the battle-ships will be constructed in government yards.

The second-class battle-ship *Tréhouart* was launched at the Caudan Yard, opposite L'Orient, May 12. She was originally designed as a coast-defense armor-clad of moderate freeboard, but her design was changed, her freeboard forward increased six and a half feet, and she must now be regarded as a second-class sea-going battle-ship. Her dimensions are, length, 283 feet 9 inches; beam, 58 feet 5 inches; depth, 42 feet 10 inches; extreme draught, 24 feet 4 inches; displacement, 6590 tons. The engines are twin-screw, triple-expansion, of 8400 estimated I. H. P., and calculated to give a speed of 16 knots. The battery consists of two 11.8-inch B. L. R. in turrets,—one forward, one aft; eight 5.9-inch R. F. G. in broadside, forward and after pairs firing in line with keel; four 3-pounder R. F. G., ten 1-pounder R. F. G., and two torpedo-ejectors, one on each side amidships on armor-deck. The single military-mast is forward of the smokepipes, of which there are two. The armor-belt is complete, 9.8 to 18.1 inches thick. The turrets are 14.5 inches thick, revolving in low barbettes or base-rings of 12.6 inches. The protective deck is 2.75 to 3.94 inches.

Russia.

The partially-protected cruiser *Vitiaz*, 2950 tons, launched in 1884, ran on a sunken rock in the Bay of Lazareff, Korea, on April 29, and was totally wrecked.

Italy.

The Italian naval estimates for 1893–94 amount to 99,738,270 lire, being 2,495,052 less than those of the preceding year. The sum of 25,000,000 lire will be devoted to new construction in finishing or carrying forward work upon the following vessels: The first-class battle-ships *Sardegna*, *Sicilia*, *Ammiraglio Saint Bon*, *Emanuel Filiberto*; of the second-class ships *Marco Polo*, *Elba*, *Calabria*, *Vittor Pisani*, *Carlo Alberto*, *A*, and *B*; of the third-class ships *Calatafimi*, *Caprera*, *Governolo*, *L*, *M*, and *N*; also a number of torpedo-boats.

Germany.

The description of the *Comet*, given in the May NOTES, is erroneous. The torpedo-gunboat *Komet* is very similar to the German dispatch-vessel *Meteor*. The dimensions are, length, 262 feet 6 inches; beam, 31 feet 2 inches; draught, 13 feet 9 inches; displacement, 980 tons. The engines are twin-screw, of about 5000 I. H. P., and the expected speed is about 22 knots. The battery consists of four 2.9-inch R. F. G. and nine small R. F. G. and machine guns. One torpedo launching-carriage is fitted.

The imperial yacht *Hohenzollern*, also described in the May NOTES, has completed her trials. The reported speed is 22 knots, but in default of knowledge as to the conditions of the trial, the information is of little importance in determining her real capabilities.

The armament of the mail-steamers *Fürst Bismarck*, *Normannia*, *Columbia*, *Augusta Victoria*, *Spree*, *Havel*, and

Lahn, when fitted as auxiliary cruisers, will consist of eight 6-inch, four 4.7-inch, two 8.5-inch, two 6-pounders, all rapid-fire guns, and seventeen smaller rapid-fire and machine guns.

Brazil.

The cruiser *Almirante Barroso*, 1960 tons, ran on a rock in the Red Sea off Ras Ghareb, near Suez, and was totally wrecked. There was no loss of life.

United States.

The official report of the trial of the *New York* gives the results as follows:

RUN NORTH.

	Port.	Starboard.
Maximum revolutions . .	135.3	136.2
Average revolutions . . .	134.7	134.6
Maximum steam-pressure at engines	173 lbs.	170 lbs.
Average steam-pressure at engines	170 lbs.	168 lbs.
Maximum air-pressure . .	2.1 inches.	
Average air-pressure . . .	1 8 inches.	
Elapsed time	2 hrs., 0 min., 51 sec.	
Observed speed	20.83 knots.	

RUN SOUTH.

	Port.	Starboard.
Maximum revolutions . .	137.1	135.7
Average revolutions . . .	135.4	134.7
Maximum steam-pressure at engines	173 lbs.	169 lbs.
Average steam-pressure at engines	169 lbs.	168 lbs.
Maximum air-pressure . .	2.8 inches.	
Average air-pressure . . .	2.0 inches.	
Elapsed time	1 hr., 56 min., 59 sec.	
Observed speed	21.36 knots.	

The horse-power of the main engines was 8635.65 for the port engine and 8311.64 for the starboard engine, a total for main engines of 16,947.29. The power of the auxiliary engines will raise these figures very considerably. The mean corrected speed was 21 knots.

No accident or hitch occurred during the trial. No journal heated unduly, nor was any water used on bearings except as a matter of precaution. No leaks or other weaknesses developed in the boilers or machinery during the trial, or were discoverable upon subsequent careful examination. The board concludes its report with the conclusion that the "*New York* . . . has a combination of superior speed, good armor-protection, disposition of battery, excellent sea-going qualities, and rare habitability, leaving little, if anything, to be desired for the purpose for which she was designed."

Among the conclusions of the board was that "The readings of the patent logs were so wide apart and so inconsistent as to furnish no trustworthy measure of the speed of the ship at such unusually high velocities, however convenient and useful at rates more commonly experienced."

Immediately preceding the trial the vessel was brought down to her exact load-draught. The sea was smooth and wind light. The course, accurately measured, was marked by seven vessels, the position of each being determined by angles, and which served as stations for observing the tidal current. The ship answered her helm quickly and steered easily, but whether due to sluggish compasses or improper steering, the track was frequently tortuous, and must have decreased the speed, both actual and apparent.

The trial of the *New York* attracted much attention, both here and abroad. The American papers of the day following the trial in large head-lines proclaimed her the fastest cruiser afloat. This statement was denied as ridiculous by many foreign papers. Commenting upon it, the *Army and Navy Gazette* (London) says, "The American newspapers claim from this that she (the *New York*) is the fastest large war-ship afloat, which is manifestly a mistake. For if, as a correspondent of the *Standard* (London) says, the *New York* was specially designed to beat the *Blake* and *Blenheim*, not only has she failed to do so, but the *Edgars* can also give her points." The above embodies the English claim to superiority, and we will proceed to examine it in detail.

The *Blake* was given a natural-draft trial November 18, 1891. The trial lasted seven hours. The mean results were, revolutions, 89; I. H. P., 14,525; speed by patent log, 19.28 knots. During the trial four runs were made over the measured mile; resulting mean speed, 19.12 knots. This constitutes the *Blake's* record. She was never tried with forced draft for fear of serious accident with the boilers, which are of a type admitted to be a failure.

The *Blenheim* (9000 tons) is a sister ship to the *Blake* in all respects, except that her boilers have the original common combustion-chamber (the boilers were double-ended), divided by a water-leg or partition. On her first natural-draft trial she developed a speed of 20.4 knots by patent log, with 14,925 I. H. P. and 94 6 revolutions. She then attempted a forced-draft trial. After running 28 *patent-log* miles in 1 hour and 4 minutes her boilers began to leak, and the trial for full speed discontinued. The above-described trials took place in January and February, 1892. On October 20, 1892, the *Blenheim* had a successful forced-draft trial in the North Sea. The results were, I. H. P., 21,411; speed by *patent log*, 21.6 knots. The engines worked smoothly, and no trouble was experienced with the boilers. The trial lasted four hours. The reported speed does not seem to be disproportionate to the horse-power developed, and it seems probable that she actually attained it. It is quite possible that she may have even reached 22 knots. What is really certain is that the patent log is wholly unreliable. In the case of the *New York* it is said that the patent logs gave an apparent speed of 23 knots.

The first-class protected cruisers of the *Edgar* type are nine in number,—viz., *Crescent*, *Gibraltar*, *Royal Arthur*, *St. George*, *Edgar*, *Endymion*, *Grafton*, *Hawke*, and *Theseus*. The first four are sheathed and coppered and have certain differences in the hull above the water-line, but it is not necessary to consider them here. The boilers and engines as constructed were identical in all. Four have not yet been tried. Only two of these vessels, the *Edgar* and *Hawke*, have been tried with forced draft; and one other, the *Grafton*, will be. The results of the *Hawke's* trials were, revolutions, 102.18; I. H. P., 12,521; speed, about 20 knots. The air-pressure was only 0.44 of an inch, and the boilers were therefore not greatly pushed. The *Edgar's* trials consisted of two parts,—trials at sea with natural and forced draft, and progressive trials over the measured mile. Of the latter only the higher speeds concern us and will be quoted. The following table explains itself:

SEA TRIALS.

	Revs.	Speed.	I.H.P.
Natural draft	99.2	19.25	10,200
Full power	104.5	20 97	12,550

MEASURED MILE TRIALS.

	Revs.	Speed.	I.H.P.
At 19 knots	92.8	18.836	8,520
Full speed	106.2	20.488	13,260

The speeds on the sea trials were determined as usual by the patent log. Compare the revolutions, speed, and I. H. P. at full power in the sea and measured mile trials. Surely we may be permitted to doubt that any vessel which requires 13,260 I. H. P. and 106.2 revolutions to attain 20.5 knots on the measured mile can at sea, with 700 *less* I. H. P. and 1.7 *less* revolutions, attain a speed 0.5 of a knot greater, even if the depth of water on the measured mile was insufficient. Again, observe the revolutions and speed on the two sea trials. An increase of 5.3 revolutions gives an increase of speed of 1.72 knots,—a manifest absurdity, under the circumstances. The real speed, had it been measured correctly, would probably have been found to be about 20.2 knots.

The above represents the case as fully as the limited space permits, with one exception, and that is the German cruiser *Kaiserin Augusta*, which took part in the recent naval review in New York harbor. She is reported to have made 22 knots, but the editor of these NOTES regrets that the information he possesses in regard to her trials is so meagre and doubtful in character as to be practically valueless for purposes of analysis, but he doubts her ability to maintain 22 knots over an 80-knot course.

The battle-ship *Massachusetts* was launched at Cramp's yard June 10.

The four-hour forced-draft trial of the gunboat *Machias* took place over a measured base in Long Island Sound on June 10, and was successful in all respects. The trial passed off without accident or hitch of any kind. The boilers, engines, and auxiliary machinery functioned properly and showed no signs of weakness or other defects. The behavior of the vessel in a sea-way was not tested, as the sea was very smooth. The course

was thirty miles in length, and one run was made each way over it. The average revolutions were 216. The uncorrected speed was 15.17 knots; corrected for tidal currents, etc., 15.46 knots, which entitles the contractors to $45,000 premium. The vessel, as in all trials of United States vessels, was at her exact designed load-draught.

HEAVY GUNS.

The forgings for the nickel-steel gun are ready for assembly at the Washington gun-shops. The jacketing will be done by a new process invented by William Sellers, of Philadelphia. Under the proposed method the jacket is placed in a horizontal position in the furnace and the heat applied continuously, while the tube, through which a stream of water runs, is forced to its proper place. This gun is an 8-inch B. L. R., 35 calibres in length, weight, 31,300 pounds. The forgings contain three per cent. of nickel, and their tests showed results as follows: Tube, 85,000 tensile strength, 42,000 elastic limit, and 20 per cent. elongation; jacket and plug, 90,000 tensile strength, 45,000 elastic limit, and 18 per cent. elongation; trunnion-band, 90,000 tensile strength, 45,000 elastic limit, and 18 per cent. elongation.

The West Point Foundry has completed five of the eleven 8-inch guns under contract for the ordnance department of the army, and is now at work on the remaining six, which are to be delivered at the rate of one every three months, beginning August 1.

The new plant of the Gatling Ordnance Company at Gatling, a new suburb of Buffalo, was dedicated June 8. Dr. Gatling himself addressed the six hundred people present, saying that the company would manufacture the largest and most serviceable guns in the world, cast in a single piece, to take the place of those now employed by the nations of the world. Guns that would do five times the work at a third less cost. Dr. Gatling superintended placing the corner-stone and dedicated the plant. Among those present was Colonel Wood, the newly-elected president of the Gatling Ordnance Company.

The Bethlehem Iron-Works has been given the contract for the forgings of the 8-inch high-power guns for firing high explosives, to be built on the Hearst reenforced system. The forgings are to be delivered in two months. The work of finishing and assembling will be performed at the Washington Navy-Yard.

The 16-cm. (6.3-inch) gun, constructed at the Ruelle Works for the purpose of studying and comparing the relative performances of slow-burning and smokeless powder, is stated to have already given velocities in excess of 1200 metres (3937 f. s.). This gun is built up in four pieces. The breech piece, or gun proper, has a length of 50 calibres, which can be elongated, by the addition of the other three pieces, to a total length of 90 calibres. In the preliminary experiments carried out at Ruelle, when velocities of 1200 metres were attained, the gun passed through the ordeal without showing any signs of strain. Further and more exhaustive experiments are to take place shortly at the Gavre range, near L'Orient.

RAPID-FIRE, MACHINE, AND FIELD GUNS.

Bids have been asked by the ordnance department of the army for twenty .30-calibre machine guns.

Two Sponsel rapid-fire 6-pounders have been ordered for the revenue marines. Fifty additional pieces will, it is said, be ordered shortly.

TORPEDOES, TORPEDO-NETS, AND TORPEDO-GUNS.

Extensive experiments are reported to have been made in Germany with the Buonaccorsi torpedo, which is similar in some respects to the Whitehead. Propulsion is effected by the escape of compressed air from the tips of the propeller-blades. A speed of 2000 yards in two minutes has been attained. This is at the rate of about 30 knots. The mechanism of propulsion is much simpler than

that of the Whitehead; the other features are practically identical, and it is claimed that the Whitehead can be readily transformed into a Buonaccorsi at small expense.

SMALL-ARMS AND EQUIPMENTS.

After examining and testing all the small-arms of American design which were presented, the army trial board adjourned May 16. The final report leaves the original recommendation practically unchanged. The Krag-Jörgensen model, No. 5 slightly modified, will therefore be the new infantry rifle. The piece will be manufactured at the Springfield armory, which will be equipped and ready to begin production during July.

The *Reichswehr* states that the German small-arms trial commission is conducting experiments with aluminum-cased ammunition for small-arms in lieu of brass. Ammunition of this kind is henceforth to be served out to sentries.

It is reported that the Germans will also apply aluminum to another use,—in making up the metal articles in a soldier's kit. The new kit will, it is said, be 25 pounds instead of 62 as formerly. The figures given certainly cannot be correct, but no doubt considerable saving can be effected.

A new attachment has been fitted to the Austrian Mannlicher rifle permitting of automatic firing, and this only when the arm is pointed at the angle with the horizon, which corresponds with a given altitude and consequently with a given distance. An electric device was invented by a German colonel to do the same thing, but it was too complicated. A watchmaker patented one such device depending on springs. In the present design, the mechanism comes into action when the piece is at the proper elevation, presses the trigger, and fires the piece.

GUNPOWDER AND EXPLOSIVES.

The following extract from a lecture by Lieutenant-Colonel F. W. J. Barker, R.A., before the British Royal Artillery Institution, gives a very good, though brief, description of cordite and the method of manufacture. It derives its name from its structure, the powder being made up of strings or cords of varying thickness, from about 0.03 to 0.5 of an inch in diameter. The thicker cordite is cut into lengths of fourteen inches, that for field guns eleven inches, and the small-arm ammunition charge is made up of sixty strands. Cordite, "a smokeless propellant of the combined nitro-glycerin and nitro-cellulose (gun-cotton) type, is composed of 37 per cent. gun-cotton, 58 per cent. nitro-glycerin, and 5 per cent. mineral jelly (vaseline), after incorporating and mixing a proportion of acetone (an ingredient obtained from the products of the distillation of wood). Finally ejected from a cylinder through a narrow opening, the cordite assumes the stringy form from which its name is derived. As to results, taking the case of the magazine rifle, where black powder, seventy grains, gave some 1830 feet velocity, cordite, thirty grains, gives about 2000 feet. In a field-gun, one pound and a half-ounce of smokeless powder (cordite) develops 1710 feet velocity,—four pounds of black powder being required for a similar result. Cordite has successfully withstood the effects of all climates at Waltham. It has been exposed in an open porch to rain, snow, sun, etc., retaining its force unimpaired. The destructive effect upon the bores of rifles at first observed has of late been greatly diminished by the use of certain wads."

Maximite, a new nitro-cellulose explosive, the invention of Hudson Maxim, of New York, has been placed upon the market. It is almost smokeless, is unfreezable, and said to be about equal in power to nitro-glycerin; but it is much safer, being insensible to moderate shock, and requiring a temperature of 400° F. for explosion by direct heat. Its use so far has been confined to commercial work, blasting, etc.

At Aldershot, England, artillery operations were conducted over an extensive area in order to test the comparative visibility of guns using cordite and black powder. It was found that at long ranges it was almost impossible to discover the positions of guns using the

smokeless powder, whereas those using black powder were readily discovered.

Two Wheeler 12-inch, deck-piercing, mortar shells were tested at Sandy Hook on June 9. The target was a 4.5-inch low-carbon, all-steel plate, 5 by 16 feet, recently delivered by Carnegie for the purpose. It was placed at an angle of 60° with the horizontal, to represent the inclination of a ship's protective deck to the direction of flight at impact of an attacking mortar shell, and it was strongly backed with two feet of solid pine securely braced. The mortar was placed with its axis horizontal and fired in that position. A preliminary shot was fired at the ordinary butt to determine the velocity, and gave 905 foot-seconds. The shells weighed 775.5 pounds apiece, containing no bursting charge. The first shot was directed at a point 2 feet from the left edge and about 18 inches below the centre line. It cracked the target in an irregular, nearly vertical line through the point of impact. The part of the target to the left of the vertical crack was split into three principal pieces, of which the lower and smaller ones were detached from the backing; the upper piece was displaced several inches to the left, but was retained on the backing by a single bolt much bent and twisted. The edges of the shot-hole were nearly red-hot. The shell perforated the plate, but was broken up. Nineteen small pieces of the base end were recovered, but the point and most of the body entered the sand, but so deeply that they were not found, and whether in one piece or not is unknown. The second shot was fired at a point three feet from the newly-formed left edge of the plate, producing the same sort of fractures, detaching some pieces and leaving some displaced on the face of the target. The shell perforated the target completely, but was not recovered owing to the depth it sank in the sand butt. No pieces were found, and it was believed to be intact. The decision of the officers in charge was that the shells had failed to fulfill the contract requirements, and the lot of 64 which they represented was rejected. The charge of powder used in the tests was 64 pounds of brown prismatic.

ARMOR.

The Bethlehem and Carnegie armor plants are now in full operation, and are capable of turning out four to five hundred tons per month each, according to the character of the product as regards size, thickness, comp sition, etc. Up to the middle of June the former had furnished about 2500 tons of accepted plates, the latter 2000 tons. The special furnaces for the treatment of plates by the Harvey process are completed, and large deliveries of this class of armor may now be expected. The first lot to be treated consists of 492 tons of side armor for the *Maine*.

The armor for the Spanish armored-cruiser *Emperador Carlos V.* has been ordered from John Brown & Co. It is to be compound, surface-hardened by the Tresidder process. A portion of the armor for the Russian battle-ship *III Saints* has been ordered of Vickers, and will be of nickel-steel Harveyed; the remainder of her armor will be obtained from Creuzot and St. Chamond.

A Vickers nickel-steel Harveyed plate was recently tested at Gâvre. The thickness of the plate was 26.8 centimetres (10.55 inches); the calibre of the gun used, 24 centimetres (9.44 inches). The first shot, velocity 580 metres (1903 f. s.), failed to get through, but caused three deep cracks; the second shot, velocity 700 metres (2296 f. s.), passed through the plate and buried itself at a distance of 1800 yards beyond; the third shot, velocity 650 metres (2132 f. s.), also passed through, but its impact was on one of the cracks previously formed; the fourth shot, velocity 630 metres (2067 f. s.), was directed at a fragment, and not only failed to perforate, but was broken up without injury to the armor.

MISCELLANEOUS MILITARY NOTES.

The following details of the army and defenses of Belgium are derived from an article in the *Écho de L'Armée* by a superior officer of the Belgian army. The only Belgian fortresses are both on the German frontier,—Liège, defended by twelve forts, and Namur, defended

by nine. Notwithstanding the position of her most important line of defense, Belgium, and especially the king, are said to be most friendly to Germany, and if the German emperor should enter the country nothing more than an official protest would be attempted. The Belgian standing army, according to the latest official figures, consists of 19 regiments of infantry, with an effective strength of 1745 officers and 29,000 men; 8 regiments of cavalry, with 304 officers and 5800 men; 8 regiments of artillery, with 534 officers and 8000 men; 1 corps of engineers, with 146 officers and 5000 men; army service and other corps and general staff, 631 officers and 1300 men. This gives the total strength of the Belgian army on a peace footing as 3360 officers and 49,100 men, and on a war footing it would be increased to about 3750 officers and 125,000 men. The "civic guards," which were used in suppressing the riots during the recent strikes, are a kind of national guard, including all men from twenty-one to fifty years of age not belonging to the regular army. In time of peace the civic guards are independent of the department of war, taking their orders only from the burgomasters. They are used for the maintenance of public order, and are mostly without any military training and of no particular value in case of war.

An experiment with bicyclists as couriers for the purpose of rapid mobilization was recently tried at Erfurt, Germany. Eleven wheelmen were employed to deliver the orders calling out the reserve men in the district. The orders were carried in tin boxes attached to the machines, and were delivered by the cyclists to the authorities of each village for local distribution. The result was highly successful; all the forty-three hamlets and villages of the district were visited within an hour and a half, and twenty minutes later all the reserve men were assembled in each village.

According to the *Reichswehr* the strength of the Bulgarian army is as follows: 1 general, 1 colonel, 166 lieutenant-colonels, 106 majors, 214 captains, 29 captains of cavalry, 634 first lieutenants, 672 second lieutenants, 76 medical and veterinary officers, making a total of 2096 officers, with 4844 non-commissioned officers, and a total peace strength of 29,967. The war strength, including officers and militia, is put down at 195,000 combatants.

The color of the uniform of the Austrian army is being changed from dark blue to a bluish gray. All arms of the service have practically the same fatigue-dress.

Experiments in this country with aluminum for horseshoes cast grave doubts upon the reports of its success in Russia. The American experiments indicate that for equal weight of shoe, strength, durability, and cost are in favor of steel.

A British officer, who has recently returned to Simla from the Pamirs, states that the Russians have marked out lines for sixteen hundred men at Murghabi Fort, and considers that Russia intends to find pretexts this summer for moving troops into the Oxus.

The final results of the tests of the Dowe bullet-proof clothing are unfavorable. The material is expensive, and the garment or shield would be clumsy and cumbersome, while with little difficulty a weapon could be produced which would pierce it. These facts have caused the German commission to decline to consider it further.

The recently-constructed defenses of Constantinople consist of several well-placed earthworks mounting heavy Krupp guns in barbette. External observing stations are connected with the guns. The principal gun employed is the 40-calibre, 35.5-centimetre (13.97-inch) Krupp. The weight of the projectile is 725 kilogrammes (1598 pounds), muzzle velocity 720 metres (2362 feet). General Brialmont, who has been called in as an adviser to the Turkish government, has advised the construction of armored towers and Gruson cupolas, but their necessity is not apparent in view of the excellent command of the present fortifications, and the expense is likely to prevent their serious consideration.

The new French *loi d'encadrement*, having for its chief object to embody the reserves, as agreed upon jointly by the Army Committee and the Ministry of War, is briefly as follows: In the infantry 72 regiments will have each a colonel, a lieutenant-colonel, and six majors; 73 regiments will have a supplementary lieutenant-colonel and a major less; every infantry regiment will have a paymaster and *capitaine du habillement* (who may be retained until the age of sixty), 12 first captains, 11 second captains, and 30 subalterns. The cavalry will be provided with officers according to the law of 1875, but the paymaster will serve as in the infantry, and one of the captains will serve as *capitaine du habillement*. In the artillery 1 major and 3 second captains will be added to each of the 38 regiments, 2 captains to the pontoon regiments, and 1 each to the fortress regiments and mountain batteries. The proposed grouping of the Alpine batteries and of the detached batteries in Algeria and Tunis is abandoned, and the creation of 2 new battalions is subordinated to the conditions of recruitment. The proposed suppression of 120 artillery subalterns (to be replaced in case of war by cadets from Fontainebleau) is adopted. The engineer troops are to consist of 4 regiments of sappers and miners (each of 5 battalions, formed severally of 4 companies), with a company of guides, a railway regiment of 3 battalions, also with a company of guides, and a battalion for Africa of 4 mixed companies, with a depot company. To the staff will be added 7 *généraux d'armée*, and the generals of division will number 100, but the former may be increased to 10 in time of war. In opposition to the views of General Loizillon, the committee proposes to increase the service corps by 14 functionaries. There is also to be an increase in the medical staff. In regard to expenditure, the report involves an increase of 423,144 francs beyond the outlay projected by the late minister; but if the Chamber should adopt the modifications proposed by the government in relation to the enlistment of non-commissioned officers, an economy of 2,102,856 francs will be effected.

MISCELLANEOUS NOTES.

The Bureau of Yards and Docks is engaged upon the plans for a timber dry-dock at Algiers. As there is a rise and fall of water in the course of a year in the Mississippi of seventeen feet, the problem of getting a dock sufficiently low and one protected from the floods of the river as well is an interesting one.

The weight of opinion in the British navy is at present in favor of sheathing all vessels which may be required to keep the sea for any considerable length of time, even if they are always expected to remain on the home station. Docking when near at hand might often prove to be impossible, owing to inability to spare the ship for the purpose, and it must always be inconvenient in time of war. Eight battle-ships and forty-six cruisers in the British navy are sheathed; while in France, of the ten large cruisers under construction, eight are sheathed, one unsheathed, and one uncertain whether sheathed or not.

Plans for introducing electric propulsion on the New York canals are gradually maturing. Ten thousand dollars was appropriated by the last Legislature for trials of electric power, and Governor Flower says that experiments will soon be made upon the Rochester and Schenectady levels to test a number of devices of the trolley order. He is assured that the object can be successfully accomplished. It will, he says, cost between fifty and sixty cents a day to propel a boat by means of electricity, while horse-power now costs two dollars a day, so that there will be a large saving of money as well as time.

MERCANTILE MARITIME NOTES.

The projected steamship line between Tacoma and Honolulu will commence running in a few weeks.

The rumor concerning the ordering of a monster White Star liner is again revived, but nothing definite is known except that the keel of no such vessel has yet been laid.

Last year 55 iron and steel vessels of 51,374 tons were built in this country, of which 27 were constructed at Atlantic and 28 at Lake ports.

The passenger steamer *Manitou* was launched at South Chicago May 20. Her dimensions are, length, 295 feet; beam, 42 feet; tonnage, 2500. The speed with natural draft will be 15 to 16 knots. Moderate forced draft is provided.

The Massachusetts Legislature has again endeavored to secure the construction of a canal across the Cape Cod isthmus. There have been numerous attempts and some work has actually been done, but the enterprise has always been abandoned after a time for some reason or other.

The direction of the Manchester Ship Canal announces that it will be open for traffic in January next.

The business of the North German Lloyd Steamship Company was attended last year with a profit of £30,159. In 1891 the loss was £153,029, and in 1890 the profit was £184,626. The subsidized lines to Australia and the East were carried on at a loss, but this loss was less than in 1891 and 1890.

The number of vessels passing through the Suez Canal during 1890-92 was as follows: 1890, 3389; 1891, 4207; 1892, 3559. During 1892 the total net tonnage was 986,748 less than in 1891, and 821,934 greater than in 1890. The receipts were, in 1890, 66,984,000 francs; in 1891, 83,422,101 francs; in 1892, 74,452,436 francs. The proportion of the total tonnage flying the British flag averages about seventy-five per cent.

It is reported that a syndicate of wealthy Californians has organized the International Construction Company for the purpose of aiding the construction of the Nicaragua Canal. The company proposes to obtain the contract for building the western section of the canal from the lake to Brito. The capital is stated to be $10 000,000. Among the incorporators are Irving M. Scott, J. W. Mackay, Louis Gerstle, W. M. Merry, and Alex. C. Hamilton. The comparative apathy of the people of the Pacific Coast during the canal agitation has been one of the features of its history, and the present waking up to a sense of its importance to them is a sign that the Californians are at last alive to their interests.

The Canadian Pacific Railway Company has established a line of steamers with a monthly service between Australia and New Zealand and Vancouver, *via* Honolulu, and the steamers *Miowera* and *Warimoo*, 5000 tons each, have been placed on the route. The pioneer vessel, the *Miowera*, sailed from Sydney May 18, and arrived at Vancouver June 9. The government of New South Wales has granted the line a subsidy of £12,000 per year. Queensland is expected to do likewise as soon as the Parliament meets, and the Canadian government has promised £25,000, which, as the vessels are said to be very fast, a further subsidy from the British Admiralty is deemed likely.

The Morgan Line steamer *El Cid* was launched at Newport News May 31. She is a sister ship of *El Rio*, launched last November, and now in service on the line. Her dimensions are, length over all, 406 feet; beam, 48 feet; depth, 33.9 feet. Her displacement tonnage is about 4500. Her engines are triple-expansion, cylinders measuring 32, 52, and 84 inches in diameter by 54 inches stroke. The steam, at a pressure of 167 pounds, will be furnished by three double-ended Scotch boilers with three furnaces in each end. The designed speed is 16 knots, but the *Rio* on trial showed herself capable of making 17 knots, and no doubt the *Cid* will do as well.

L. S. Van Duzer,
Lieutenant U.S.N.

SERVICE SALAD.

A Diamond Ear-ring.

WHY do I wear this ball and chain? Say, cully, that question is kind of personal, ain't it? and, besides, that sentry there'd not let you listen two minutes, and he'd bounce me for not pilin' this wood.

Oh, you've got leave to talk to me, have you? And you want to hear my story? But there ain't any story. Yes, of course I'll tell you what there is to tell, and get a rest at the same time.

Well, you see, I was down on my luck, and enlisted and got sent to this post on the frontier, and about a thousand miles from anywhere. After I had been here a bit I began lookin' for a snap where I could make a few extra dollars and not have to injure my health with hard work. See? I wanted all the money I could get, for, as I was so near, I intended visitin' Frisco without makin' 'em sorry by sayin' good-by.

One day, before I had found my snap, I was sent up to Captain Toplif's house to help move some furniture. While I was there the idea struck me that a chap might make a good thing workin' about an officer's house: he was sure to pick up a few cigars and a drink or two, if nothin' else, and he was always paid. So I made myself useful, and when the fatigue party was dismissed told Miss Toplif, the captain's sister that lived with him, that if she wanted anythin' else done I'd stop and do it. She said no then, but in a day or two she wanted somethin' done, and she sent for me, and after that she kept on sendin' for me when a man was wanted to do any extra work. She spoke about me before the other officers' ladies in such a way that they got to sendin' for me too, so that in time I had, as you might say, the run of the officers' quarters, and had got my snap. Whenever the ladies wanted a carpet put down, or curtains put up, or ice-cream froze for their parties, or such like, there was always a call for Private Hennessey. Though Toplif was not my captain, I was at his house most of all. As I say, his sister got in the way of callin' on me, and soon I was as familiar about the place as the regular dog-robber.

Miss Toplif was a nice lady and a favorite in the garrison, I could see. She was pretty, too; takin' her all in all, the prettiest in the post.

There was another young lady on the post named Hitchcock. Miss Lizzie they called her. She wasn't as pretty as Miss Toplif, but considerable younger. They were regular pards, and in one or other's houses all the time. I'd hear 'em talkin' when I'd be about the house, and the talk would generally always be about a chap named Center. He was second lieutenant of Miss Toplif's brother's company, and had only been out of West Point two or three years. They couldn't be together two minutes without his name poppin' up. And when it did, good-by to any other subject for that time. It seemed to me Miss Toplif was the one that always fetched his name up.

There was a nice little thing in Toplif's kitchen. She was a daisy, if she did put dish on me, and to my mind prettier than either of them in the parlor. I was always sure of somethin' to eat out of her, and it was a cold day when I couldn't get a drink. She'd quite a roll socked away, and I would generally get a bill out of it when I was broke. She was careful about her money, though, savin' it until my time was up and we got married, she said, then we'd have somethin' to start on. Poor little

chippy! She'd come from back East with Miss Toplif when she came out to live with her brother; and knew her mistress pretty well. Well, she naturally told me a good deal. She told me Miss Toplif was dead gone on Center, and was doin' all she knew how to get him to marry her, but that Center was mashed on the little Hitchcock, although she'd give him the cold shake two or three times, and that he wouldn't look at Toplif.

"Laws," Maggie'd say, "Miss Kate would like to bite Miss Hitchcock's nose off every time she kisses her so lovin' like."

One day I went up-stairs to look around. I knew Toplif was on the target range, and thought his sister was out too. Howsomever, I could have told any one I met I'd come up to fix the spare-room curtain. I'd broke it the week before, to have it handy in case an excuse for bein' up-stairs was ever needed. Oh, I'm no chump. I'm fly, as the poet sings. I met nobody, though, and, as everythin' was still and the door open, I just stepped into Miss Toplif's room to see if everythin' was safe,—see?—and there, layin' on the floor alongside her bureau, was one of her diamond ear-rings. It had fallen out of the box she kept her jewelry in, which was on the bureau. Here was luck; here was fortune; here was enough to take me to Frisco and start me there. Alone in the house, and that ear-ring layin' twinklin' there, as much as to say, "Here I am, a-waitin' for you." I felt that the streak of bad luck that had run me into the army was over. Such a chance as this must be a sign of comin' good fortune. In less than no time that ear-ring was in a hole in the ground behind the wood-shed, and I was in the stable paintin' some flower-boxes for Miss Toplif.

When Maggie came back from the commissary, where she'd gone for grub, I followed her into the kitchen. She thought it was the first time I'd been there that day, and I, just naturally like, didn't say anythin' to put her right.

While we was talkin' Miss Toplif calls out to know if that was Hennessey in the kitchen.

"Yes, ma'am," says I.

"Then come up here, please," says she; "there's somethin' wrong with the spare-room curtain."

Up I goes, and when I gets on the stair-landin' I see Miss Hitchcock alone in Miss Toplif's room, lookin' in the box holdin' the jewelry.

Miss Toplif stayed in the room with me all the time I was fixin' the curtain, and I left her there when I went down-stairs.

Well, sir, the losin' that ear-ring didn't make near the rumpus I thought it would. It was what's called a solytare, and a big one at that. I calculated on gettin' six hundred for it, even in the little town of Snakeville here; so I thought the miss would go wild over it, but she didn't. For a week they didn't want me at the house, and I didn't go up. There's no use puttin' your head in a lion's jaw, as the play-actor says; you might let somethin' drop.

At last Hogarty, the striker, said Miss Toplif wanted me to do somethin' for her. On my way I stopped in the kitchen a minute, in hopes Maggie'd say somethin' about the ear-ring. And she did: told me it was lost, and, though they had hunted high and low, it couldn't be found, and that her mistress was in a great way about it. I was wanted to sew a rip in the parlor carpet. While I was doin' it Miss Toplif was a-dustin' around the gimcracks in the room.

"Miss," I says, "Maggie tells me you've lost a ear-ring."

"Yes," she says, "one of my beautiful diamonds that's been in our fam'ly for generations. They're heirlooms, and the only really valuable things I possess."

"That's too bad, miss," says I; "can't you think how you lost it?"

"I can't say," says she, "I only know it's gone, but I can't imagine how."

"Miss," says I, kind o' meek like as if I was strikin' an old woman for a dollar on account of bein' an orphan, "you've been mighty kind and good to me since I've been here, and I'd like to show my gratitude, and I'll do my best to try and find that ear-ring for you."

She was very thankful, said I had a good heart, and give me fifty cents. I asked her a lot of questions, sayin' they would be pointers, and then I says, "But

you haven't told me, miss, when you lost it."

"Oh," says she, "last Wednesday; a week ago yesterday."

I didn't say anythin' for a little while, and then I says slow, more as if I was talkin' to myself than to her,—

"Last Wednesday? Let me see: that was the day you and me and Miss Hitchcock was fixin' the spare-room curtain. I've got it, miss," I says, speakin' up excited and hittin' the floor. "Wednesday was the day little Dutchy deserted. He's got that ear-ring, and maybe I can get on his trail."

"I'm afraid it'd do no good, Hennessey. He couldn't possibly have got it."

"Um, ah, yes, that's so," says I, quietin' down.

I went on sewin' as if I was thinkin' for all that was out, and she went on dustin' around. Of course, I was watchin' her all the time. Suddenly she gives a start and looks over towards me in a quick sort of a way. She was very pale, and there was a queer look in her eyes. Thinks I, "My daisy, I wouldn't want you for a wife."

She dusted one spot for about five minutes, and then left the room. And I felt like goin' too. What if that little Dutchy speech made her suspicious of me? I tell you I didn't feel easy until after taps that night.

It was not very long after that until it was plain trouble had taken place between Miss Toplif and Miss Hitchcock. They didn't go into one another's houses, nor walk about together, as they used to. Then it became known that Miss Toplif suspicioned Miss Hitchcock of lootin' her ear-ring. After that there was the devil to pay and no pitch hot. Mrs. and Miss Hitchcock called on Miss Toplif and had it out one mornin'. Accordin' to Maggie, the mother got bested. Toplif and Hitchcock had a fight on the board-walk and got put in arrest. Some of the people wondered how Miss Toplif could dare to accuse Miss Hitchcock of such an awful thing; but Miss Toplif didn't accuse her; she was too bloomin' knowin' for that. But in some way no feller could find out, it got circulated on the post that Miss Hitchcock's actions on the day the ear-ring was lost were most suspicious, and that there was doubt as to whether she had taken it or not. Of course, everybody said they didn't believe it for a moment. But there was the story. Miss Hitchcock had been alone in a room with the box of jewels; the ear-ring was there when she went in, and soon after she went out it was gone.

After a time things settled down a bit, but they had been red-hot, you bet. They didn't settle down as slick as they had been, though. You see, in a big six-company post like this there's quite a gang. Old Hitch had enemies, and then there's always some one that's ready to believe the worst of everybody and the like, and so there was two parties,—those that believed Miss Hitchcock guilty and those that didn't. Poor little thing! my heart used to ache for her, seein' her goin' about so pale like, some a hardly speakin' to her, and some a overdoin' it, bein' so howlin' friendly that a person could see in a minute there was somethin' amiss with her that needed defendin'. I used to go and look where that ear-ring was buried, and think how much it was goin' to do for me to brace up. I felt awful sorry she was unjustly accused, but it was better than my bein' justly so. For what says the poet?—every chap has got to mind his eye.

There was one that took Miss Hitchcock's side, and his doin' so was poison to Miss Toplif. It was Center. He hadn't been goin' around Miss Hitchcock much before this trouble, for, as I tell you, she'd given him the grand bounce. But now he was most attentive, doin' the escort act for all it was worth, dancin' with her at the parties, ridin' with her, showin' in every way he didn't suspicion her.

One evenin', when I was orderly for the officer for the day, I was waitin' for him in the passage just outside the officers' club-room. I could hear every word they said inside, and, when the door opened, see 'em all. They was maybe a dozen or fifteen in there, settin' around, smokin' and talkin' and lushin'. Among 'em was Center and a first lieutenant named Blackley, a big cuss about forty years old. Center was a small, ordinary-lookin' man, not twenty-five.

"I'm told," said a captain, "Hitchcock's thinkin' of sendin' his family East. It'll be a bad move."

"Yes," answered another. "He oughtn't to do that."

"Why not," says Center, "if he wants to?"

"Oh, well," says the man spoken to, laughin' like, "it's better to face it out."

"Face out what?" says Center, again.

"Oh, come, Center," chips in Blackley, "you know well enough what's meant. It's this trouble Miss Lizzie's got into. If Hitchcock sends his family East, it'd look as if they were runnin' away from it."

"But Miss Hitchcock's in no trouble," says Center, "that I know of. My heavens, these insinuations and hints against a young girl disgust a decent man. An angry woman intimates a disgraceful action on the part of a girl she envies and others take it up, and, like her, intimate what they are afraid to speak outright,—faugh!"

"Look out, Center," says the major, "or you'll be makin' bad worse."

"Major," says Center, "that's just it: hints and innuendoes are all right made against one, but any attempt at defense is all wrong. Trouble, heh? the trouble is a lack of kindness of heart, a readiness to believe good and gentlemanly feelings."

"See here, Center," says Blackley, and I could hear his chair scrapin' as he shoved it from the table, "are you speakin' at me? I spoke of Miss Hitchcock bein' in trouble, and I say again she *is* in trouble."

"And I say she is not. Miss Hitchcock needs no defense by me or any one else," says little Center; "but I am tired of this talk about my friend, and don't propose to listen to any more of it. If you've anythin' against Miss Hitchcock, go to her father and tell him. Don't sit at a club-table and spit out poison. If I had the right,—and I wish I had,—by my soul I'd make you prove your dirty words or own them lies."

"This has gone far enough, Lieutenant Center," says the major, in his court-martial voice.

"But you see you haven't got the right, and never will have," says Blackley.

This tame answer fell pretty flat. Most of the officers were on a line with the keyhole, and I could see they looked at Blackley as if he was a sandless sucker.

A few minutes afterwards Center comes out of the room as red as his undershirt, and stamped off as if he'd bust every plank on the board-walk. As a good many officers in the room were married, it wasn't long before every one on the post knew of the row. Maggie told me it cut Miss Toplif into little pieces. That callin' her an angry woman and the other an innocent girl was wormwood and aloes run into one. And then she'd been expectin' Center'd spoon her when he heard of the ear-ring business. But she missed it there, for now he didn't go near her, and Miss Toplif was in a state of mind. Maggie said a buzz-saw was a plaything to her, and I worked the on-duty racket as often as I dared when she sent for me. I guess she come to wish she hadn't started the ball against Miss Hitchcock, for after Center's row with Blackley public opinion veered, as the newspapers says, and people began to fight shy of Miss Kate. She was the one that got the cold shoulder of mutton now, and the one that was talkin' about goin' back East.

I was gettin' ready for a little pasear myself, only I was a-goin' West: Frisco was my meat. As I say, I calculated on gettin' at least six hundred for the sparkler. It was a bouncer, and Miss Toplif she give out it was an heirloom, and had been her great-grandmother's, a stone of the first water; that she'd been offered immense sums for the pair. With six hundred I could make a start. There's great chances for a man in the West, especially a new man with some Eastern polish about him. So I gets all ready to light out, and went down to Snakeville to get rid of the diamond. I had to spout it there to get the stuff to take me to Frisco; in those days that cost over a hundred. There's an Ikey in the town that keeps an assay office, and if he sees you're fly he'll buy anythin' you offer him and ask no questions. I'd spoken to him about the jewel and he was ready

for me. But after all we couldn't make a dicker. It was no go; it couldn't be done. I got the Sheeny in a back room and threatened him; no use; I had to come back with my ear-ring in one of the folds of my shirt. As you can guess, I was pretty riled. Everythin' upset, for I couldn't get away. I tried to think out a plan, and the only one I could hit on was to borrow enough to get me to Frisco. I had to get away, you see, because one or two little things 'ud come to light in a short time that 'ud interfere with the freedom of my future movements if I was on hand then. I concluded to strike Maggie first off, and get as much as I could out of that wad of hers. So, after retreat, I goes up to the house. I could see she was mad when I looked in at the kitchen window to make sure Miss Toplif wasn't there. The dear girl was slashin' things about at a devil of a rate.

"So," she says, as soon as I got inside, "you're goin' to desert, are you?"

Well, sir, that flabbergasted me, and all I could say was, "Shut your head! Do you want to give me away?"

She cackled more than laughed, and said, "I suspected it, and now I know it. You have give yourself away. You are a nice one to run away from your flag and break your oath and go to Leavenworth for five years! What are you goin' to do about me, I want to know? Didn't you swear to make me an honest woman?"

"Oh, stow your gab," says I, having had time to think a bit; "who's goin' to run away? I'll marry you straight enough when my time is up, and meanwhile come give me a kiss."

"See here, Hennessey," she says, comin' and standin' in front of me, "you better not try any games on me, and mind I tell you so. Man, I know enough to send you up for ten years."

"Cut that," says I, jumpin' up scared as a rabbit. "Don't say another word, or I'll hurt you."

"I watched you through the fence this afternoon," she went on, "and saw you dig up Miss Kate's ear-ring."

"Shut up, I tell you!" I said, and give her one on the mouth.

I was excited, and it was harder than I meant. She fell back into a chair and began to cry. And now the devil played me a nice turn, for, instead of molly-coddlin' and lally-gaggin' her, what must I do but begin bullyin' her and swearin' around, sayin' she was mistaken. She kept sayin' she thought I was more of a man than to hit a woman, but she wouldn't do anythin' to get me in trouble, though she didn't believe I loved her any more, and such guff. I says to her, like the born fool I was, says I, "Look here, Maggie, if you don't swear on the book that you'll never say a word about the bawbee I'll marry Molly Flaherty."

Gee-whiz, but that started her. "You will, will you?" she gasps out. "No, you won't. I swear I'll put you in the mill the first step you take towards her."

Maggie was awful jealous, and of Molly most of all. "Hennessey," she says, pale and tremblin', "swear to me you won't go near that Molly Flaherty. You had better. Believe me, you had."

But thinkin' I knew somethin' about women, I says, "Not till I see how you act, Maggie dear. If you keep a still tongue in your head it'll be all right; if not, it'll be all wrong, as I tell you."

"You had better promise me, Hennessey," she said. "I'm not foolin'."

I only laughed and went away. Of course, now I had to skip, whether or no. I knew Maggie'd never split, because she'd be afraid I'd go back on her, but she might give me away without meanin' it.

I got everythin' ready and was layin' down, waitin' for taps to go, when Center comes into the quarters. I felt he was after me, and jumped off my bunk.

"Hold on," he says. "Halt! I want you, Hennessey." I looked back, saw he had me covered with his six-shooter, and halted. He called to a file of the guard he had with him, and I was taken into the orderly-room and searched. Center searched me himself. If he hadn't that ear-ring would never have been found, for I had it sewed up in a fold of my shirt. But Center he felt every inch of every blessed garment; he'd 'a' found a hair off a dead flea's back.

"Who give me away, lieutenant?" I asked, as I started towards the jug.

"Never mind now; you'll find out soon enough," says he.

They clapped this ball and chain on me the next mornin', and that evenin' the officer of the day told me I was to be tried for stealin' a diamond ear-ring valued at eleven hundred dollars, the property of Miss Toplif. I didn't try very hard to find who peached on me, for I didn't care. I thought more of workin' a certain little racket than anythin' else. I did find out, though. I'm blessed if it wasn't Maggie. She told me so when I went to empty an ash-barrel in Toplif's yard, with my ball and chain on. She made a devil of a hullaballou, cried, asked me to forgive her, said she was sorry the minute after she'd told Center, but what I'd said about Molly Flaherty had made her crazy, offered me all her money to help me escape, and went on in a great way, right before the sentry guardin' me. I give it to her hot at first, and then gradually cooled down, told her I'd think of her when I was in the State's prison, and would try to forgive her for ruinin' my life, and so on. I tell you I got her worked up in fine style. I took a tenner from her that day, and got a many more while I was waitin' trial.

Miss Toplif, she got very uneasy, Maggie told me, when I'd see her in the yard. She demanded the ear-ring, and couldn't understand why it should be wanted on the trial, nor why she'd have to be a witness to identify it. That, she said, she wouldn't be. Her brother could tell all she knew, and it was necessary for her to go East at once, and she was goin'. I've got a letter in a safe place that she wrote then that'll fetch me a pretty penny when I'm out of this.

Well, they had a spell with her, and in the end she went into the court and testified, but she wouldn't state the value of the ear-ring. "Was it worth one hundred dollars?" She believed it to be. "Was it worth fifteen hundred dollars?" It was worth more than that to her. The charge was grand larceny, so the value of the ear-ring might make the difference to me between years of imprisonment and months of it. I submitted this to the court, but no use, she wouldn't say anything definite. Of course, they easy enough proved my havin' the ear-ring in my possession and Maggie havin' seen me dig it up. When it came my turn for witnesses I called Marks, the Snakeville jeweler. After the judge-advocate asked him his questions, I says,—

"Mr. Marks, what is the value of that ear-ring on the table?"

Marks, he took it and looked at it, wet it with his tongue, held it up to the light, twisted his head around:

"Twenty dollars at the outside," says Marks.

Well, sir, you never see such an astonished set of men as that court was in in your life.

"Nonsense," says the president; "a diamond of that size worth less than twenty dollars?"

"It isn't a diamond, colonel," says Marks. "It's only a clever imitation of one. A Frenchman discovered the process of makin' them about three years ago, and at first they deceived even experts until tests were applied."

"I don't believe it," puts in Blackley, who was sweet on Miss Toplif, after about two minutes' silence. "This witness is most likely a confederate of the accused's, and thinks he is doin' him good by such a transparent——"

The president raps on the table. "Order!" he says. "Lieutenant, your remarks are improper and uncalled for. The court'll be cleared."

After that there was an adjournment, and nothin' was done for over a fortnight. I heard the ear-ring was sent to Frisco for examination, and found to be as Marks said. Miss Toplif started East that night, and hasn't come back. It's said she never will. She'd have gall if she did, after accusin' Miss Hitchcock of stealin' her great-grandma's ear-ring that was made three years before.

When the court come together they found me guilty of petit larceny and give me eight months. And that's how I got this ball and chain.

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MILITARY ORDER OF THE LOYAL LEGION OF THE UNITED STATES.

Companions of the Loyal Legion are invited to contribute to this department. News of the Commanderies is always welcome, but suggestions likely to inure to the benefit of the whole organization are of higher value, and therefore particularly desired. The pages of the Loyal Legion Department of the "United Service" are always at the service of members of the Order desiring to discuss matters of general interest to their comrades of the Military Order of the Loyal Legion.

Illinois Commandery.

Stated meeting held June 15, 1893.

To THE FIRST CLASS.—**N. A. Reed, Jr., Lt. U.S.V.; Edward R. Blake, Lt. U.S.V.; P. W. Stanhope, Col. U.S.A.**

Stated meeting held July 13, 1893.

Ebenezer H. Thurston, Surg. U.S.V.; Wm. P. Wright, Lt. U.S.V.; John Zimmerman, Lt.

To THE FIRST CLASS (by inheritance).—**Geo. H. Hurlbut.**

To THE SECOND CLASS.—**Troy S. Kinney, Walter Newell, Edward I. Prickett.**

NECROLOGY.

Illinois Commandery.

Mr. Edward Corse, June 4, 1893.

California Commandery.

Porter Edminster, May 10, 1893.

PHILADELPHIA, July 1, 1893.

DEAR SIR AND COMPANION:

Under the unanimous resolution of the Pennsylvania Commandery, the Board of Officers have accepted the invitation of the Companions residing in Reading and vicinity to hold the fall meeting in the city of Reading under their auspices.

The arrangements for a special train will be announced in a future circular.

Companions desiring hotel accommodations will be pleased to write to Lieutenant L. CRATER, Reading, Pa.

D. MCM. GREGG, *Commander.*
JOHN P. NICHOLSON, *Recorder.*

Meetings authorized by the commandery of the State of Pennsylvania:

Wednesday, October 4, 1893, Reading, Pa.; Wednesday, February 7, 1894, Philadelphia; Wednesday, May 2, 1894, Philadelphia.

Meetings of the Board of Officers at head-quarters, 139 South Seventh Street, Philadelphia:

Monday, October 2, 1893; Monday, November 13, 1893; Monday, January 8, 1894; Monday, March 5, 1894; Monday, April 2, 1894, Monday, May 4, 1894.

May 1 the California Commandery reported six hundred and fifty-four members, and the following comparison of the gains and losses during this and the previous years will be of interest, as follows:

	1887-88.	1888-89.	1889-90.	1890-91.	1891-92.	1892-93.
Gain—						
By election.....	40	46	44	38	86	27
By transfer.....	5	15	13	19	11	9
Total gain	45	61	57	57	97	36
Loss—						
By transfer.....	19	25	21	22	21	24
By death.....	10	10	12	21	14	9
Dropped	...	...	2	2	7	2
Resigned.....	...	...	...	1	...	...
Total loss.....	29	35	35	46	42	35
Net gain.....	16	26	22	11	55	1